Monica Berti

DIGITAL EDITIONS OF HISTORICAL FRAGMENTARY TEXTS

Propylaeum
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ALTERTUMSWISSENSCHAFTEN

Digital Editions of
Historical Fragmentary Texts

DIGITAL CLASSICS BOOKS – **5**

DIGITAL EDITIONS
OF HISTORICAL FRAGMENTARY TEXTS

Monica Berti

Monica Berti ⬤ https://orcid.org/0000-0003-2779-4229

(PD Dr.) is a Classicist and Digital Humanist. Her research is focused on the Graeco-Roman World and the Computational Analysis of Ancient Greek and Latin. She teaches academic courses in Ancient History, Digital Classics, and Digital Philology. She completed her Habilitation in Ancient History and Digital Humanities at the University of Leipzig.

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A culture based upon the printed book, which has prevailed from the Renaissance until lately, has bequeathed to us — along with its immeasurable riches – snobberies which ought to be cast aside. We ought to take a fresh look at tradition, considered not as the inert acceptance of a fossilized corpus of themes and conventions, but as an organic habit of re-creating what has been received and is handed on.

Harry Levin in Albert B. Lord. *The Singer of Tales.* 2nd ed., xxxi

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List of Abbreviations

AGWN	Ancient Greek WordNet
APD	The Arabic Papyrological Database
APIS	Advanced Papyrological Information System
BerlPap	Berliner Papyrusdatenbank
BNJ	Brill's New Jacoby
BNP	Brill's New Pauly
BP	Bibliographie Papyrologique
BTL	Bibliotheca Teubneriana Latina
CGL	Corpus Grammaticorum Latinorum
CHGIS	China Historical GIS
CHI	Cultural Heritage Imaging
CIG	Corpus Inscriptionum Graecarum
CITE	Collections, Indices, Texts, and Extensions
CLTK	The Classical Language Toolkit
CTS	Canonical Text Services
DARE	Digital Atlas of the Roman Empire
DCLP	Digital Corpus of Literary Papyri
DDbDP	The Duke Databank of Documentary Papyri
DFHG	Digital Fragmenta Historicorum Graecorum
DGE	Diccionario Griego-Español
DigilibLT	Digital library of late-antique Latin texts
DLL	Digital Latin Library
DPP	Digitizing Patterns of Power
DTA	Deutsches Textarchiv
eAQUA	Extraktion von strukturiertem Wissen aus Antiken Quellen für die Altertumswissenschaft
EDR	Epigraphic Database Roma
EpiDoc	Epigraphic Documents in TEI XML
eTRAP	Electronic Text Reuse Acquisition Project

FF1KG	Free First Thousand Years of Greek
FGrHist	Die Fragmente der griechischen Historiker
FHG	Fragmenta Historicorum Graecorum
First1KGreek	First One-Thousand Years of Greek
FRBR	Functional Requirements for Bibliographic Records
FTE	Fragmentary Texts Editor
GODOT	Graph of Dated Objects and Texts
HGIS	Historical-Geographic Information System
HGV	Heidelberger Gesamtverzeichnis der griechischen Papyrusurkunden Ägyptens
HMT	Homer Multitext
HOL	Harpokration On Line
HRR	Historicorum Romanorum Reliquiae
IG	Inscriptiones Graecae
IIIF	International Image Interoperability Framework
JO	Jacoby Online
KITAB	Knowledge, Information Technology, and the Arabic Book
KomFrag	Kommentierung der Fragmente der griechischen Komödie
LDAB	Leuven Database of Ancient Books
LGPN	Lexicon of Greek Personal Names
LLT–A	Library of Latin Texts Series A
LOD	Linked Open Data
LOFTS	Leipzig Open Fragmentary Texts Series
LSJ	Liddell-Scott-Jones, Greek-English Lexicon
LyncSyr	Linking Syriac Data
MADS	Metadata Authority Description Standard
METS	Metadata Encoding & Transmission Standard
MiddleLS	Liddell-Scott, Intermediate Greek-English Lexicon
MODS	Metadata Object Description Standard
MoEML	Map of Early Modern London
NER	Named Entity Recognition
OAC	Open Annotation Core Data Model
OCR	Optical Character Recognition

OGIS	Orientis Graeci Inscriptiones Selectae
OGL	Open Greek and Latin
OSEO	Oxford Scholarly Editions Online
P.Berol.	Papyri Berolinenses
P.Cair.	Papyri Cairenses
P.Giss.	Papyri Gissenses
P.Lond.	Papyri Londinenses
P.Mich.	Michigan Papyri
P.Oxy	Oxyrhynchus Papyri
PHI	Packard Humanities Institute
PhoOL	Photios On Line
PROV	Provenance Data Model
PSI	Papiri della Società Italiana
RDF	Resource Description Framework
SAM	Systematic Assertion Model
SNAP:DRGN	Standards for Networking Ancient Prosopographies
SOL	Suda On Line
SoSOL	Son of SUDA Online
TEI	Text Encoding Initiative
TLG	Thesaurus Linguae Graecae
TM	Trismegistos
TRAVIz	Text Reuse Alignment Vizualization
VIAF	Virtual International Authority File

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Acknowledgments

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My research is deeply inspired by Neel Smith and Christopher Blackwell, with whom I have spent many hours to discuss the complexities of philological citations. Their students at the College of the Holy Cross and at Furman University have helped me with creative questions, suggestions, and concrete data production.

A variety of topics of this book has been also discussed with Gabriel Bodard, Charlotte Roueché, and Simona Stoyanova, who have helped me expand the EpiDoc Guidelines for representing historical fragmentary texts.

Gregory Nagy, Lenny Muellener, and Kenny Morrell at the Harvard's Center for Hellenic Studies helped me develop the international program *Sunoikisis Digital Classics*, thanks to which I can offer online courses in Digital Classics that are of great inspiration for my work.

I'm very grateful to Charlotte Schubert for our discussions on Digital Classics and for her precious help in finalizing and publishing this monograph.

I also thank Stefan Schorn and Ernest Suyver for our fruitful conversations on the complexities of representing historical fragmentary texts in the digital age.

Finally, my deep acknowledgment is to my husband Gianluca, who has been teaching me how to program in order to study Classical sources and who has been helping me create the projects described in this volume.

Introduction

This book is the publication of the Habilitation monograph that I wrote to describe the results of new experimental research in Digital Classics carried out at the University of Leipzig as part of the *Open Philology* project of the Alexander von Humboldt Chair of Digital Humanities.

The aim of this monograph is to present a new model for producing digital editions of historical fragmentary texts, by which I mean texts that are now lost in their original form and transmitted only through quotations and reuses in later works. Being a Classicist, in this research I analyze ancient Greek and Latin sources with a main focus on historiography. The choice of this topic is due to three main circumstances: 1) an interest in Greek fragmentary historiography that led me to explore this genre and publish papers and critical editions of fragmentary authors,[1] 2) a related interest in the transmission of Classical texts and in the philological contribution of the Alexandrian Library,[2] and 3) the impact of the digital revolution on Greek and Latin that brought me to work with the *Perseus Project* at Tufts University and with the *Open Greek and Latin* initiative at the University of Leipzig.[3]

The meaning of the term *edition* in the title of this book has to be explained, given that this word is the focus of many scholarly debates in recent publications concerning the Digital Humanities.[4] In my work, the expression *digital edition* refers not to the publication of a new reconstructed text of Greek historical fragments that is the result of autopsies and new readings of manuscripts and other historical media, but to the *critical* selection, production, analysis, interpretation and annotation of digital data about fragmentary authors and works. Scholars

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1   This work began as part of a collaboration with the Italian series *I Frammenti degli Storici Greci* at the University of Roma Tor Vergata and as part of my contribution as a copy editor and author of the Brill's *Jacoby Online* project. Results of these activities are available in the following publications: Berti (2009a); Berti (2009b); Berti (2010); Berti (2012); Berti (2013a); Berti (2013b); Berti/Jackson (2015); Martin/Berti (2017).

2   Berti/Costa (2010); Berti/Costa (2013); Berti (2014a); Berti (2014b); Berti (2015a).

3   *Open Greek and Latin* (OGL) is part of the *Open Philology* project developed by the Alexander von Humboldt Chair of Digital Humanities at the University of Leipzig under the direction of Gregory R. Crane: Baumgardt/Berti et al. (2014); Berti (2019a). Beside this monograph, results of my research on digital editions of historical fragmentary texts are available in the following publications: Berti/Romanello et al. (2009); Romanello/Boschetti et al. (2009); Almas/Berti (2013); Berti/Almas (2013); Büchler/Geßner et al. (2013); Berti/Almas et al. (2014–2015); Berti (2015b); Yousef/Berti (2015); Berti/Almas et al. (2016); Berti/Bizzoni et al. (2016); Berti/Blackwell et al. (2016); Berti/Daniels et al. (2016); Berti (2017a); Berti (2018); Berti (2019b); Berti (2019c).

4   Many bibliographic resources on these debates have been produced and are easily accessible by searching the *Internet*. The most recent and significant contributions are Sahle (2013), Apollon/Bélisle et al. (2014), Pierazzo (2015), and Sahle (2016).

with enough experience in digital data know that the computational environment is bringing new questions and solutions to the treatment and preservation of historical texts. Centuries of philological practice have been contributing in an impressive manner to the advancement of our knowledge of the Greco-Roman world thanks to the technology of the printed book. If the goal of the digital turn is to preserve these results and continue these exegetical efforts, it is indisputable that the digital medium is very different from the printed medium and that it requires a different approach.

This monograph describes practical and concrete problems that scholars have to deal with when trying to digitally represent and analyze textual fragments of lost authors and works. Publishing *printed* historical fragments is a very difficult and complex task. Publishing *digital* historical fragments is an even more difficult and complex task, because, if we always need to answer critical research questions, we also have to navigate in a new dimension where we can't rely on the work of our predecessors and we can't make use of conventions and standards established by philology in the printed age.

This is the reason why results described in this book are experimental and address new issues that still have to be properly discussed and solved if we want to take full advantage of digital technologies and fulfill our responsibility to preserve the Greek and Latin textual heritage. When I started my work on this topic, the technology was different and many digital resources for analyzing Greek and Latin were missing. A lot of time was spent on producing data and rethinking our approach to historical sources.[5] My future work and the work of future generations will certainly help go beyond naiveties and mistakes of this first phase of research in Digital Classics.

Experiments and results of my research are also profoundly influenced by and indebted to very different scholary environments I have been working for. My Italian academic background taught me the principles of historiographical research. My activities at the *Perseus Project* represented a fundamental moment to move from analog to digital philology and concretely experiment with the production of digital textual fragments. My research and teaching duties in the Institute of Computer Science at the University of Leipzig have given me the possibility to deepen the computational aspect and produce new resources.

The outcome is a very interdisciplinary product that also reflects what is happening not only in Classics, but also in Computational Linguistics and Digital Humanities, where we can see the birth and growth of many projects that apply new technologies to the study of historical languages and of the ancient world.[6]

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5   Cf. Jannidis/Kohle et al. (2017) for a decription of the work of a humanist today, who needs to combine expertise both in Computer Science and in his/her relevant humanities field.

6   For a description of the current state of the art of Digital Classical Philology, see Berti (2019a) and Chronopoulos/Maier et al. (2020).

This monograph is structured in five chapters that introduce the new domain of digital fragmentary literature and describe two related projects that I have been working on in the last five years: the *Digital Fragmenta Historicorum Graecorum* and the *Digital Athenaeus.*

Chapter 1 (*Fragmentary Texts and Print Culture*) explains the meaning of the word *fragment* in Classical studies and individuates the most important scholarly phases that have been producing modern collections of fragmentary texts. Statistics are offered to quantify the amount of fragmentary authors and works on the basis of available digital data, and a description of the characteristics of printed editions of historical fragmentary texts is provided to show the role of the technology of the printed book in shaping the field of fragmentary historiography in the last two centuries.

Chapter 2 (*Fragmentary Texts and the Digital Revolution*) describes the first generation of digital libraries where fragmentary texts are collected and published in a way that still depends on the printed editorial practice. The chapter analyzes how hypertextual theories are important for a new model of fragmentary texts in a digital environment and describes the concept of cover-text, that helps philologists move the attention from the isolated fragment to its context of transmission. The chapter describes also experimental implementations of computational techniques that in the future will be hopefully applied to the domain of fragmentary literature, such as text reuse detection, intertextual analysis, and translation alignment.

Chapter 3 (*Distributed Annotations of Fragmentary Texts*) explains the new idea of conceiving fragmentary texts as annotations of textual elements about lost authors and works. It also describes two resources for producing canonical citations and annotations of historical fragments: the *CITE Architecture* and the *Perseids Fragmentary Texts Editor.*

Chapter 4 (*Digital Fragmenta Historicorum Graecorum*) is the description of the *Digital Fragmenta Historicorum Graecorum* (DFHG), which is the dynamic and expanded version of the printed edition of the *Fragmenta Historicorum Graecorum* (FHG) edited by Karl Müller.

Chapter 5 (*Digital Athenaeus*) is the description of the *Digital Athenaeus*, which is a project that provides an inventory of authors and works cited in the *Deipnosophists* of Athenaeus of Naucratis and implements a data model for identifying, analyzing, and citing uniquely instances of text reuse, in order to produce a text-based and annotated catalog of Greek fragmentary authors and works.

The *Digital Fragmenta Historicorum Graecorum* is not the mere digitization of a printed collection, but the extraction, expansion, and deep analysis of its data to produce further resources for the study of Greek fragmentary historians and their works. The reasons for choosing this collection are fully explained in the

following pages. Nevertheless and given the topic of this monograph, a reader could ask why I didn't produce a new born-digital edition of Greek fragmentary historians. I have two main answers to this question.

The first answer is that many extant sources that preserve Greek historical fragments are still missing in an open and digital format. A comparison with the first volume of the indices of *Die Fragmente der griechischen Historiker* by Pierre Bonnechère shows how many sources of fragments and editions are not yet digitized.[7] This situation will be certainly overcome in the next decades, but today is a significant limit considering that a complete collection of source texts preserving testimonies and fragments is the preliminary condition to produce an edition of a fragmentary author.

The second answer is that the time at my disposal for this project would have allowed me to work only on one fragmentary author or on a small group of authors with a limited number of fragments. The adverb *only* in this sentence may seem provocative, because the study of a single fragmentary author can be extremely difficult and time consuming, as I know by experience. But, if we change our perspective from a traditional philological point of view to a computational point of view, this adverb makes better sense. Focusing on one author or on a small group of authors would have resulted in a work very similar to what I edited in a printed format, without a proper exploration of new computational possibilities. The goal of this research was not to replicate what we can still achieve with the technology of the printed book, but to experiment with new forms of analysis in a digital environment, where a single fragmentary author or a few hundreds fragments are not enough as an object of study.[8]

This book shows that digital libraries are transforming the concept of textual fragments. If in printed books textual fragments are chunks of texts extracted from their original context, in digital editions they are annotations of textual elements pertaining to lost authors and works. The *Digital Athenaeus* project was born from the need to produce this model and move from the perspective of the quoted author to that of the quoting author, which will be the prevailing perspective in the future development of digital fragmentary literature. The choice of the *Deipnosophists* is not only due to historical and philological reasons that are extensively described in the following pages, but also to the fact that its main editions are openly available in a digital format and that data can be extracted and structured from them in a sustainable way.

This monograph is written in English for two main reasons. The first reason is that English is not only the language of the Digital Humanities, but also

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7   Bonnechère (1999).
8   For important recent contributions on digital data and literary studies, see Piper (2018), Eve (2019), Lemercier/Zalc (2019), and Underwood (2019).

the natural language that in the last decades has produced models and programming languages to analyze textual data. If our responsibility as humanists and philologists is to translate and express these models into other languages, we can't renounce to describe the results of our research in English, given that this language permeates methods and standards of Digital Philology.

The second reason is that I was employed as an Academic Assistant of the Alexander von Humboldt Chair of Digital Humanities at the University of Leipzig to develop an English program for teaching and research. I achieved this task by contributing to the creation of a new Bachelor of Science and a new Master of Science in Digital Humanities, where I currently teach courses in Digital Philology and Digital Classics.[9] I also fulfilled this task by promoting research projects, conferences, and publications that include data described in this book.[10]

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9   Part of this task was also the creation of *Sunoikisis Digital Classics*, which is an international consortium of Digital Classics programs developed in collaboration with the Harvard's Center for Hellenic Studies and the Institute of Classical Studies at the University of London: Berti/Crane et al. (2015); Berti (2016b); Berti (2017c); Berti (2017b).

10 Bibliographic resources are collected in the *Bibliography* at the end of the volume with DOIs and dates of access. The volume cites many links that are not provided with stable identifiers, but are important to show the current state of research. The last access to these links was on July 23, 2021. The *Index* at the end of the volume lists Digital Humanities and Digital Classics projects not explicitly mentioned in chapter and section titles.

1 Fragmentary Texts and Print Culture

This chapter explains the meaning and the development of the word *fragment* when referred to the domain of literary texts and print culture. The first section (1.1) distinguishes between material fragments of ancient evidence and textual fragments represented by quotations and text reuses. The second section (1.2) traces the relationship between Classical scholarship and textual fragments by individuating the most important phases that have been producing modern collections of fragmentary authors and works. The third section (1.3) offers statistics for quantifying the amount of fragmentary authors and works based on data available in contemporary digital libraries. The fourth section (1.4) analyzes characteristics of printed editions of historical fragmentary texts in order to understand the role of the technology of printed books in determining the birth and the growth of fragmentary historiography in the last two centuries.

1.1 Fragments and Fragmentary Texts

The English term *fragment* comes from the Latin word *fragmentum* and from the verb *frangere*, which means *to break*. The *Oxford English Dictionary* defines *fragment* (s.v.) as "a part broken off or otherwise detached from a whole; a broken piece; a (comparatively) small detached portion of anything." The word can also be used figuratively as "a detached, isolated, or incomplete part; a (comparatively) small portion of anything; a part remaining or still preserved when the whole is lost or destroyed." As far as artistic or literary works are concerned, the word refers to "an extant portion of a writing or composition which as a whole is lost; also, a portion of a work left uncompleted by its author; hence, a part of any unfinished whole or uncompleted design."

These definitions show that the inner characteristic of a fragment is its being the surviving piece of something irremediably lost or never finished. In this sense the word is applied to a great variety of physical remains of ancient evidence, such as monumental ruins, potsherds, scraps of papyri and broken inscriptions. The boundaries of these fragments are marked by margins, whose materiality draws our attention to the exteriority of the evidence, influencing our reconstruction of

the wholeness to which the fragment belonged and our perception of the reasons of its fragmentation, usually due to an external violent event like destruction or consumption.[1]

Most of what we still have from the ancient world has been preserved in a fragmented form and physical fragments include many typologies ranging from big architectural elements to small sherds. When physical fragments bear textual evidence the materiality of the fragment extends also to the text, which becomes the surviving broken off piece of an ancient writing. Epigraphy and papyrology are the disciplines devoted to collecting, restoring, studying and integrating texts that have been engraved, painted, or written on any materials surviving from the past. Fragmentary texts of this kind include many different types of documents that pertain to public, private, documentary and literary spheres. Examples are fragments of decrees, laws, *ostraka*, gravestones, inscribed vases, brick stamps, loom weights, letters, private contracts, legal documents, accounts and literary texts.[2] An interesting group of this evidence is constituted by literary works preserved only on physical fragments. Given that this book is mainly focused on Greek historical and historiographical texts, two significant examples are the *Hellenica Oxyrhynchia* and the *Marmor Parium.*

The *Hellenica Oxyrhynchia* is a 4th century BC work of history transmitted on papyrus fragments of the 1st and 2nd century CE stored in different collections in Egypt, Great Britain, Italy and the United States of America.[3] In this case we have a fragmentary work in the literal sense of the word, because the historiographical research of the author of the *Hellenica Oxyrhynchia* — whose identity is still questioned — has been preserved only thanks to these fragments of papyrus.

The *Marmor Parium* is a Hellenistic chronicle on a marble slab coming from the Greek island of Paros. The document contains a Greek chronology (1581/80–299/98 BC) with a list of kings and archons accompanied by short references to historical events mainly based on the Athenian history. The text is dated to the 3rd century BC and part of it survives in two fragments (A and B) preserved in the Ashmolean Museum of the University of Oxford and in the Archaeological

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1   See Most (2009) and other papers on the topic in Tronzo (2009).
2   For the objects of study of epigraphy and papyrology, see Bodel (2001) and Bagnall (2009).
3   P.Oxy V 842; PSI XIII 1304; P.Cair. temp. inv. no. 26/6/27/1–35. Editions of the work have been published by Kalinka (1927), Bartoletti (1959), and Chambers (1993). Open to debate is the belonging of P.Mich. 5982, 5796b, and other papyri to the same work: see Pesely (1994) and Mariotta (2013). For a recent historiographical study of the *Hellenica Oxyrhynchia*, see Occhipinti (2016).

Museum of Paros.[4] As for the *Hellenica Oxyrhynchia*, also the *Marmor Parium* is a fragmentary work produced by an unknown author whose historiographical text is still extant only through these fragments of marble. Another example is a group of texts that the online *Thesaurus Linguae Graecae* (TLG) labels as *Anonymi Historici* (`tlg1139`). This collection includes forty historical fragmentary texts preserved on inscriptions, papyri, manuscripts and quotations in later texts.[5]

Even if technically it is not a fragmentary text, I can also mention the *Constitution of the Athenians* attributed to Aristotle. The Aristotelian work was known only thanks to quotations and text reuses until the discovery in Egypt in the 19th century of papyri bearing the text, which are now preserved in the Staatliche Museen zu Berlin and in the British Library in London.[6] The text is for the most part complete and is a very important example of a literary work transmitted only on papyrus and not through manuscript tradition in the Middle Ages.[7]

Scholarship employs the expressions *fragment* and *fragmentary text* to refer also to another kind of evidence, which is constituted by incomplete textual quotations and reuses. This category includes many different examples that range from *verbatim* quotations to paraphrases and allusions.[8] Fragmentary texts of this type can be divided into two main groups:

1. *Fragmentary texts of still extant works*. This form of reuse is attested when an ancient author quotes, paraphrases, or alludes to another author whose text has been preserved by the tradition. In this case the reuse can be compared with the original text in order to check the reliability of the quotation.

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4   IG XII 5, 444. The upper part of fragment A is lost and known only from the transcription produced by John Selden in the 17th century. Standard editions of the *Marmor Parium* are still those published by Jacoby (1904) and in FGrHist 239. Cf. also BNJ 239. The Greek text of the stone with Latin translation, chronological table, and commentary was published by Karl Müller in FHG I, whose digital version is now available as part of the *Digital Fragmenta Historicorum Graecorum* (DFHG) project, which is also producing an experimental digital edition of the *Marmor Parium*: see section 4.5. For a recent study of the literary and historiographical characteristics of the chronicle, see Rotstein (2016).

5   FGrHist (= BNJ) 18, 40, 83, 105, 148, 151, 153, 155, 159, 160, 180, 202, 203, 204, 205, 206, 252, 255, 257a, 258, 329, 352, 355, 356, 368, 369, 375, 415, 479, 506, 550, 637, 647, 839, 849; Mette (1978) 11 (64bis), 17–20 (115bis, 148, 148bis), 29 (415).

6   P.Berol. 163 (= BerlPap 5009) and P.Lond. 131. Editions of the text have been published by Kenyon (1920) and Chambers (1994). For a very detailed and comprehensive commentary, see Rhodes (1993).

7   On the relationship between fragments and the Aristotelian constitution, see Most (2009) 19.

8   Darbo-Peschanski (2004); Berti/Romanello et al. (2009); Berti (2012); Berti (2013a). On the culture and history of quotation, see also Compagnon (1979) and Finnegan (2011).

Examples are citations of Homer, Herodotus, Thucydides or Xenophon in the *Deipnosophists* of Athenaeus of Naucratis.[9] Here is an example for Herodotus:

Deipn. 12.58 = 541bc: περὶ δὲ Σμινδυρίδου τοῦ Συβαρίτου καὶ τῆς τούτου τρυφῆς ἱστόρησεν Ἡρόδοτος ἐν τῇ ἕκτῃ, ὡς ἀποπλέων ἐπὶ τὴν μνηστείαν τῆς Κλεισθένους τοῦ Σικυωνίων τυράννου θυγατρὸς Ἀγαρίστης, φησίν, ἀπὸ μὲν Ἰταλίης Σμινδυρίδης ὁ Ἱπποκράτεος Συβαρίτης, ὃς ἐπὶ πλεῖστον δὴ χλιδῆς εἷς ἀνὴρ ἀφίκετο. εἵποντο γοῦν αὐτῷ χίλιοι μάγειροι καὶ ὀρνιθευταί. ἱστορεῖ περὶ αὐτοῦ καὶ Τίμαιος ἐν τῇ ἑβδόμῃ.[10]

Hdt. 6.127.1: ἀπὸ μὲν δὴ Ἰταλίης ἦλθε Σμινδυρίδης ὁ Ἱπποκράτεος Συβαρίτης, ὃς ἐπὶ πλεῖστον δὴ χλιδῆς εἷς ἀνὴρ ἀπίκετο (ἡ δὲ Σύβαρις ἤκμαζε τοῦτον τὸν χρόνον μάλιστα), καὶ Σιρίτης Δάμασος Ἀμύριος τοῦ σοφοῦ λεγομένου παῖς.[11]

Athenaeus quotes almost *verbatim* the words of Herodotus, but the context is different because he is talking about people who are famous for their love for luxury (τρυφή), while the Halicarnassensis is mentioning Smindyrides in a passage concerning the family of the Alcmeonidae and he uses only the term χλιδή (extravagance), which is different from τρυφή (luxury). If the work of Herodotus was lost, we could read his words through Athenaeus, but we would attribute to him also the information about the number of cooks and fowlers accompanying the Sybarite, which doesn't appear in his text and probably comes from the lost historian Timaeus who is cited at the end of the passage.[12]

Another example is a reference to the *History of the Peloponnesian War* of Thucydides in the text of the *Deipnosophists*:

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9   Ambaglio (1990); Bouvier (2007); Bréchet (2007); Lenfant (2007c); Maisonneuve (2007); Olson (2018). On quotations of Homer in the text of the *Deipnosophists* and how to represent them in a digital environment, see Berti/Blackwell et al. (2016).

10   "Herodotus in Book VI told the story of Smindyrides of Sybaris and his addiction to luxury, describing how he sailed off to court Agariste, the daughter of Cleisthenes, the tyrant of Sicyon: From Italy, he says, came Smindyrides the son of Hippocrates of Sybaris, who was more devoted to luxury than any of the others. He was accompanied, for example, by 1000 cooks and fowlers. Timaeus also discusses him in Book VII." Trans. by Olson (2006–2012). The same story is also narrated in Athen., *Deipn.* 6.105 (= 273bc).

11   "From Italy came Smindyrides of Sybaris, son of Hippocrates, the most luxurious liver of his day (and Sybaris was then at the height of its prosperity), and Damasus of Siris, son of that Amyris who was called The Wise." Trans. by Godley (1920–1925).

12   FGrHist 566 F 9 = BNJ 566 F 9. See Ambaglio (1990) 55–56, Pelling (2000) 176–177, 180, Canfora (2001), III 1352 nn. 2–3, Lenfant (2007c) 61, Gorman/Gorman (2014) 30 nn. 55 and 191, Olson (2018) 427. For a textual alignment of the two passages, see http://demo.fragm entarytexts.org/en/athenaeus/ath-deipn-1258-a-hdt-6127.html.

Deipn. 5.15 = 189c: λέγονται δὲ Ἀθήνησι καὶ ἱεροί τινες αὐλῶνες, ὧν μέμνηται Φιλόχορος ἐν τῇ ἐνάτῃ. καλοῦσι δ᾽ ἀρσενικῶς τοὺς αὐλῶνας, ὥσπερ Θουκυδίδης ἐν τῇ δ᾽ καὶ πάντες οἱ καταλογάδην συγγραφεῖς, οἱ δὲ ποιηταὶ θηλυκῶς.[13]

Thuc. 4.103.1: ἐπὶ ταύτην οὖν ὁ Βρασίδας ἄρας ἐξ Ἀρνῶν τῆς Χαλκιδικῆς ἐπορεύετο τῷ στρατῷ. καὶ ἀφικόμενος περὶ δείλην ἐπὶ τὸν Αὐλῶνα καὶ Βορμίσκον, ᾗ ἡ Βόλβη λίμνη ἐξίησιν ἐς θάλασσαν, καὶ δειπνοποιησάμενος ἐχώρει τὴν νύκτα.[14]

The two contexts are completely different because Athenaeus is discussing the meaning of the words αὐλή (court), αὐλός (pipe), αὐλῶπις (helmet with a tube-like opening) and αὐλών (hollow), while Thucydides is talking about the march of the Spartan general Brasidas against Amphipolis and he mentions the toponym Aulon (Αὐλών) in Chalcidice. If we didn't have the text of Thucydides, it would be impossible to infer the context of his passage, as for the lost text of Philochorus who is mentioned in the same context.[15] Moreover, Athenaeus is not precise because Thucydides doesn't refer to the noun but to the geographical place, and the Naucratites was probably getting the citation of the passage of the historian from an intermediate source.[16]

   2. *Fragmentary texts of lost works.* This kind of reuse, which is the most interesting and challenging one, is represented by authors who quote, cite, or paraphrase other authors whose texts are currently lost. In this case the reuse can't be compared with the original text and its interpretation depends on many factors. An example is a passage of the *Lexicon of the Ten Orators* of Harpocration concerning the Athenian festival of the Panathenaea:[17]

Lex., s.v. Παναθήναια: Δημοσθένης Φιλιππικοῖς. διττὰ Παναθήναια ἤγετο Ἀθήνησι, τὰ μὲν καθ᾽ ἕκαστον ἐνιαυτόν, τὰ δὲ διὰ πενταε

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13   "Certain sacred *aulones* (hollows) in Athens are referred to; Philochorus mentions them in Book IX. Some authorities have the word in the masculine, as for example Thucydides in Book IV and all prose-authors, whereas the poets have it in the feminine." Trans. by Olson (2006–2012).

14   "Against this place Brasidas marched with his army, setting out from Arnae in Chalcidice. Arriving about dusk at Aulon and Bormiscus, where the lake Bolbe has its outlet into the sea, he took supper and then proceeded by night." Trans. by Smith (1928–1935).

15   FGrHist 328 F 68 = Costa (2007) F 68 = BNJ 328 F 68.

16   Zecchini (1989) 33; Ambaglio (1990) 56. For a textual alignment of the two passages, see http://demo.fragmentarytexts.org/en/athenaeus/ath-deipn-515-and-thuc-41031.html.

17   "Demosthenes (uses the word) in *Philippics*. Two (festivals called) Panathenaia were celebrated at Athens, the one yearly, the other every fifth year (i.e. four years apart). And this was called the Great (Megala). Isokrates in the *Panathenaikos* uses the expression 'a little before the Great Panathenaia.' The festival was first celebrated by Erikhthonios, son of Hephaistos, as both Hellanikos and Androtion record, each one in the first (book) of *Atthis.* Before this (the festival) was called *Athenaia*, as is made clear by Istros in the third (book) of his *Attika*." Trans. by Harding (2008) 39.

τηρίδος, ἅπερ καὶ μεγάλα ἐκάλουν. Ἰσοκράτης Παναθηναϊκῷ φησι "μικρὸν δὲ πρὸ τῶν μεγάλων Παναθηναίων." ἤγαγε δὲ τὴν ἑορτὴν πρῶτος Ἐριχθόνιος ὁ Ἡφαίστου, καθά φησιν Ἑλλάνικός τε καὶ Ἀνδροτίων, ἑκάτερος ἐν α΄ Ἀτθίδος. πρὸ τούτου δὲ Ἀθήναια ἐκαλεῖτο, ὡς δεδήλωκεν Ἴστρος ἐν γ΄ τῶν Ἀττικῶν.

In this entry Harpocration cites five authors, of whom two are still extant (Demosthenes and Isocrates) and three are lost (Hellanicus, Androtion, and Istros). Demosthenes and Isocrates are cited as examples of the use of the expressions Παναθήναια (Panathenaea) and μεγάλα Παναθήναια (great Panathenaea), but their contexts don't contain a description of the two festivals.[18] As far as the three Atthidographers are concerned and except for the few references of Harpocration, it is not possible to reconstruct the context of their texts and in fact their contribution to the history of the festival of the Panathenaea is discussed by scholars.[19]

All these examples show that the term *fragment* can be quite misleading when referred to a reused text. In most cases a fragment is not the broken off piece of a lost original text, but the result of the philological and historiographical interpretation of the scholar who has to dig into the context in order to measure the distance between the lost text and its reuse.[20] This is one of the reasons why in recent scholarship the focus has moved from the *fragment* to the preserving context, and in the digital environment the expression *text reuse* is preferred to *fragmentary text*.[21]

Classical scholarship makes also use of other terms to refer to other texts transmitted in the form of quotations and reuses, such as, for example, *epitoma*, *excerptum*, *frustulum* and *reliquia*.[22] As far as epitomes are concerned, there are many different examples among which I can remember the abridged versions of the works of Livy (including the *Periochae*), the epitome of the Aristotelian *Politeiai* by Heraclides Lembus, Iustinus' epitome of Pompeius Trogus' *Historiae*

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18 Dem. 4.35; Isocr. 12.17.

19 Hellanicus: FGrHist (BNJ) 4 F 39 = FGrHist (BNJ) 323a F 2 = Ambaglio (1980) F 162; Androtion: FGrHist (BNJ) 324 F 2 = Harding (1994) F 2; Istros: FGrHist (BNJ) 334 F 4 = Berti (2009b) F 4.

20 Schepens (1997) (166 on the concept of *cover-text* meaning the context *covering* the fragment preserved in it); Schepens (2000); Berti (2012) 445. See also Most (1997) vi on "fragments as *partes pro toto*" (*fragment and synecdoche*), and Most (2009) 10–11, who remembers that "all of the Greek and Latin words for 'fragment' are applied in antiquity only to physical objects, never to portions of discourse [...] This metaphor seems not to have been invented until relatively modern times [...] small parts of a larger text are not fragments but just quotations or excerpts."

21 See section 2.3.

22 It is not always possible to distinguish between *fragmenta* and these forms of text reuses, because many times there is an inevitable overlapping, but in any case this terminology gives a sense of the vast variety of reuses of texts of Classical works: see Most (1997).

Philippicae, Xiphilinus' epitome of the *Historia Romana* by Cassius Dio, the epitome of Athenaeus' *Deipnosophists*, and Sextus Iulius Africanus' and Eusebius' epitomes of the *Aegyptiaca* by Manetho.[23] An important example of excerpts is represented by the *Excerpta Constantiniana* that was produced in Constantinople in the 10th century under the supervision of the emperor Constantinus Porphyrogenitus, who gathered a group of *excerptores* to extract and combine excerpts about 53 topics from Classical and Byzantine historiographical works.[24] Another example is represented by the excerpts of ancient Greek geographers collected by Karl Müller in the 19th century.[25] The terms *frustula* and *reliquiae* are used, for example, to refer to groups of anonymous poetic fragments and in the collection of the fragments of the Roman historians by Hermann Peter.[26]

1.2 Classical Scholarship and Textual Fragments

Collecting fragments is not a recent activity, but dates back to ancient times when authors excerpted passages of texts in order to assemble and transmit them for many different purposes. Philologists, grammarians, and lexicographers produced collections of notes, extracts, quotations and references to other texts in order to create bibliographies and research tools about a wide range of topics. Alexandrian scholarship has a crucial role in this long and complex process that has indirectly transmitted Classical works, and the tradition also preserves traces of the methods used by authors like Pliny the Elder, Plutarch, Aulus Gellius and Athenaeus in their intellectual activities.[27]

Given that for a long period of time in antiquity texts were for the most part still availabe, in this case collecting fragments didn't originate from the need of looking for lost works, but from the necessity of producing reference tools that could facilitate information management and accessibility.[28] From the Renaissance onwards, when humanists realized that recently discovered manuscripts didn't preserve the entirety of Classical textuality, collecting fragments became

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23   See, for example, Brunt (1980), Montanari (1997), Arnott (2000), and BNP, s.v. *Epitome*.
24   The *Excerpta Constantiniana* has not survived in its entirety, but remains still allow to reconstruct methods and criteria of this monumental project: Brunt (1980) 483–485; Wilson (1983) 140–145; Roberto (2005) xxxvii ff.; Németh (2016); Németh (2018).
25   Müller (1855–1861).
26   Lloyd-Jones/Parsons (1983) 517–561 (*frustula adespota ex auctoribus*); Peter (1870–1914), who is now superseded by Cornell (2013), on whose collection see Marincola (2014) and other papers in *Histos Working Papers* 5.
27   See, for example, Pfeiffer (1968), Tosi (1988), Montanari (1993), Jacob (2000), Darbo-Peschanski (2004), Dorandi (2007) 29–46, Blair (2010), Berti (2013b), Schubert (2016), Hunt/ Smith et al. (2017), Schubert (2017).
28   Most (2009) 13–14.

a way for publishing the most celebrated authors and, after that, for gathering traces of an irremediably lost past.[29]

Glenn Most individuates two phases in the history of postclassical scholarship on collecting fragments. The first is the "humanist and early modern" phase that began in the second half of the 16th century and was "largely aesthetic in orientation," because the interest was more in publishing the very best fragments of the most important authors than in producing complete, critical, and exhaustive collections.[30] The second is the "romantic and contemporary" phase that began in the second half of the 18th century and was characterised by a "reformulated scholarship," which brought a new attempt to understand the totality of the past beyond the few surviving canonical works and "a new dignity to the fragment." These elements were fundamental for developing a new scholarship on ancient literary fragments that took off in the middle and the second half of the 19th century, when "systematic coherence and philological rigor" produced big collections of fragmentary texts belonging to many different genres, as for example epic poetry, comedy, tragedy, philosophy and historiography.[31] This second phase lies at the bottom of contemporary scholarship on fragmentary authors, which still relies on four "basic methodological pillars": 1) the efforts of identifying and attributing (a) single lost works to individual authors, (b) single fragments to individual authors and works, and (c) single fragments to literary genres but not to a particular author or work; 2) the complete and exhaustive examination of all the sources that make possible the identification of fragments; 3) the distinction between the original words of a lost text and the context in which the reference to them is preserved; 4) a systematic source criticism in order to investigate and understand, as far as possible, the relationship among the sources of fragments.[32]

A complete and detailed list of collections of fragmentary authors and works produced between the 19th and the 21st century is beyond the scope of this book, but I can cite the most important editions:

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29 On the fact that "the link between bio-bibliography, library catalogues and the hunt for lost works remains widely if unobtrusively operative," see Dionisotti (1997) 8, who explores many different forms of *fragmenta* in Classical scholarship.

30 Most (2009) 15 cites the names of Antonio Augustín, Henri II Estienne, Joseph Scaliger, Isaac Casaubon, Gerhard Johann Vossius, Pierre Gassendi, Thomas Stanley, Ralph Cudworth, Johann Jakob Brucker, Pierre Bayle, Richard Bentley, and Johann Albert Fabricius.

31 Most (2009) 16–17 cites the names of Christian Gottlob Heyne, Friedrich August Wolf, Friedrich Schlegel, Novalis, Friedrich Schleiermacher, Goerg Friedrich Creuzer, August Meineke, Johann August Nauck, and Hermann Alexander Diels. On early editions of the fragments of the Roman historians, see Pobjoy/Rich (2013). As for fragmentary historians, see Grafton (1997).

32 Most (2009) 17.

- Epic poets: *Epicorum Graecorum Fragmenta* by Gottfried Kinkel and Malcolm Davies, *Poetae Epici Graeci* by Alberto Bernabé, *Greek Epic Fragments* by Martin West, and *Early Greek Epic Fragments* by Christos Tsagalis.[33]
- Lyric poets: *Poetarum Lesbiorum Fragmenta* by Edgar Lobel and Denys Page.[34]
- Tragic poets: *Poetarum Tragicorum Graecorum Fragmenta* by Friedrich Wagner and *Tragicorum Graecorum Fragmenta* by August Nauck and Bruno Snell.[35]
- Comic poets: *Comicorum Graecorum Fragmenta* by Georg Kaibel, *Fragmenta Comicorum Graecorum* by August Meineke, *Comicorum Atticorum Fragmenta* by Theodor Kock, *Fragments of Attic Comedy* by John Edmonds, *Poetae Comici Graeci* by Rudolf Kassel and Colin Austin, and the volumes of the project *Kommentierung der Fragmente der griechischen Komödie* by Bernhard Zimmermann.[36]
- Historians: *Historicorum Graecorum Antiquissimorum Fragmenta* by Georg Creuzer, *Fragmenta Historicorum Graecorum* by Karl Müller, *Historici Graeci Minores* by Ludwig Dindorf, *Die Fragmente der griechischen Historiker* by Felix Jacoby, *Die Fragmente der griechischen Historiker Continued. Part IV* by Guido Schepens and Stefan Schorn, *Die Fragmente der griechischen Historiker Continued. Part V* by Hans-Joachim Gehrke and Felix Maier, *Brill's New Jacoby* by Ian Worthington, and *I Frammenti degli Storici Greci* by Eugenio Lanzillotta.[37]
- Philosophers: *Die Fragmente der Vorsokratiker* by Hermann Diels and Walther Kranz.[38]

This short list includes big collections that gather fragmentary authors and texts with an arrangement based on literary genres. Beside them, scholars have been also publishing many separate editions of fragmentary authors, as for example the fragments of the tragedies of Aeschylus and the fragments of Aristotle.[39] Moreover, if the 19th and 20th centuries saw the birth of big collections grouping together many fragmentary authors, in the last decades scholars have been focus-

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33 Kinkel (1877); Davies (1988); Bernabé (1987); Bernabé (1996); Bernabé (2004); Bernabé (2005); Bernabé (2007); West (2003); Tsagalis (2017).

34 Lobel/Page (1955).

35 Wagner (1844–1852); Nauck (1856); Nauck (1889); Snell (1971–2004).

36 Kaibel (1899); Meineke (1839–1857); Kock (1880–1888); Edmonds (1957–1961); Austin (1973); Kassel/Austin (1983–1995). On the KomFrag volumes, see http://www.komfrag.uni-freiburg.de.

37 Creuzer (1806); Müller (1841–1873); Dindorf (1870–1871); Jacoby (1923–1958); Schepens (1997); Schepens (1998); Worthington (2006–); Lanzillotta (2009). For other editions of ancient Greek fragmentary historians, see p. 128 n. 4.

38 Diels/Kranz (1959–1960).

39 Rose (1886); Mette (1959). A quick search in the TLG *Canon* and in the *Perseus Catalog* shows the number of editions of fragmentary texts: cf. section 1.3.

ing on commenting in details single authors. Examples are the series *I Frammenti degli Storici Greci* at the University of Roma Tor Vergata, which is separately editing authors originally published in the FGrHist of Felix Jacoby, and the project KomFrag of the University of Freiburg, which is producing monographic commentaries to authors collected in the *Poetae Comici Graeci* of Rudolf Kassel and Colin Austin.[40]

New technologies applied to philology are posing new questions and challenges about representing fragmentary texts in a digital environment. The goal of this book is to discuss these questions and offer solutions by describing the impact of the digital revolution on literary sources and by presenting the *Digital Fragmenta Historicorum Graecorum* (DFHG) and the *Digital Athenaeus* projects (see chapters 2–5). I begin by showing preliminary statistics of the amount of fragmentary authors and works at our disposal and by examining characteristics of printed editions of fragmentary texts.

1.3 How Many Fragmentary Texts?

In an important paper significantly entitled *Umblick im Trümmerfeld der griechischen Geschichtsschreibung*, Hermann Strasburger tried to quantify the "land of ruins" of ancient Greek historiograhy and came to the conclusion that the tradition has preserved only about 2.5% of what was originally written, with a ratio of 1 to 40 between what is still extant and what is lost.[41]

Given the fragmentary state of ancient evidence and its complexity, counting the amount of textual fragments and calculate its proportion in relation to what has survived from the past are a difficult task that can't produce complete and definitive results, first of all because it's not possible to establish with precision what is a fragmentary text.[42] Nevertheless, undertaking this task is important from a methodological and a numerical point of view: From a methodological point of view, because a survey of fragmentary texts helps scholars identify and overview different kinds of textual fragments and their characteristics across the centuries and in different literary cultures; from a numerical point of view, because this effort gives the opportunity to quantify — at least partially and in a relative way — the amount of evidence that we have at our disposal and the kind of work necessary to produce new editions of fragmentary authors and new collections of fragmentary works.

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40   Lanzillotta (2009); Zimmermann (2017).
41   Strasburger (1977) 9–15. See also Canfora (1995) 184–119, Canfora (2000) viii, and Schepens (2007) 59–60.
42   Cf. Brunt (1980) and Most (2009).

In a digital environment this kind of task is even more relevant because it allows research investigators to calculate the amount of data to be digitized, processed, produced, critically edited and stored. These statistics become important in order to plan digital projects that involve a certain number of people with different expertise, that might require a long period of time to be accomplished, and that consequently request an estimate of project costs.

Hermann Strasburger based his statistics on the number of pages of the *editiones minores* of the *Bibliotheca Teubneriana* and on the number of books of fragmentary works and of pages of modern collections of fragmentary historians.[43] The interest in counting books and the extent of library collections is evidenced since ancient times. Callimachus of Cyrene in his *Tables* (*Pinakes*) of ancient literature classified authors by genre and, as far as we know, probably included also information about the number of books and lines of every work.[44] Ancient authors tried also to quantify the amount of texts stored in the Library of Alexandria and modern scholars have made an effort to check the reliability of these numbers and produce new figures.[45] All these methods depend on the kind of medium by which works are transmitted, like papyri, manuscripts, printed books, and now digital data.[46] Moreover, we also have to take into account the nature and arrangement of libraries and catalogs.

Digital technologies and the World Wide Web have been creating many different resources that range from huge collections (like *Internet Archive*, *Google Books*, and *HathiTrust*) to digital library catalogs and repositories belonging to specific domains of Classical literature. Most of these projects are collecting data created for printed publications and are generating other data that is the result of a digitization workflow of printed editions. In order to quantify what is now available and what has to be done in the next decades, we can explore these digital collections to see how they reflect the "land of ruins" described by Hermann Strasburger in his paper.

As far as ancient Greek fragmentary historians and works are concerned, I provide here a first set of data and statistics drawn from different digital projects pertaining to ancient Greek literature: the *Thesaurus Linguae Graecae* (TLG), the *Perseus Catalog*, the *Open Greek and Latin* (OGL), the *First One-Thousand Years of Greek* (First1KGreek), the *Brill's New Jacoby* (BNJ), and the *Digital Fragmenta His-*

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43 Strasburger (1977) 10 ff.
44 *Suda* [K 227] s.v. Καλλίμαχος. The *Pinakes* were originally in 120 books, but only 25 fragments of it has been preserved. For the nature of this collection see, among many others, Parsons (1952) 204–218, Witty (1958), and Blum (1991). Traces of ancient criteria for calculating the extent of works can be also found in later authors as Athenaeus of Naucratis and in encyclopedic works like the *Suda*: see, for example, Jacob (2001) lxiv ff., Jacob (2004), and Berti/Blackwell et al. (2016) 123.
45 Delia (1992); Bagnall (2002); Berti/Costa (2010) 96–100.
46 Cf. Parsons (1952) 204–206, and Canfora (1988) 11–13.

toricorum Graecorum (DFHG). These resources are ongoing projects and therefore I can only offer provisional statistics, which are in any case important to understand the state of the art at the beginning of the 21st century, not only in terms of numbers but also in terms of characteristics, limits, and omissions of these collections.[47]

Thesaurus Linguae Graecae (TLG). The TLG (subscription required) is the oldest and biggest digital library of ancient Greek texts.[48] The project started in 1972 at the University of California, Irvine, with the goal of creating a digital library of Greek literaty texts from Homer (8th century BC) to 600 CE.[49] The collection was later expanded to include Byzantine works until 1453 CE and a large number of texts up to the 20th century.[50] Today the online version contains more than 110 million words from over 10,000 works associated with 4,000 authors. The TLG *Statistics* page (subscription required) shows that the TLG collects 3,293 authors for the period of time between the 8th century BC and the 20th century CE, including authors dated as *varia* and *incerta*. Limiting the selection to the centuries 8th BC through 6th CE, the TLG has 2,120 authors + 99 *varia* and 90 *incerta* for a total of 2,309 authors (fig. 1.1).
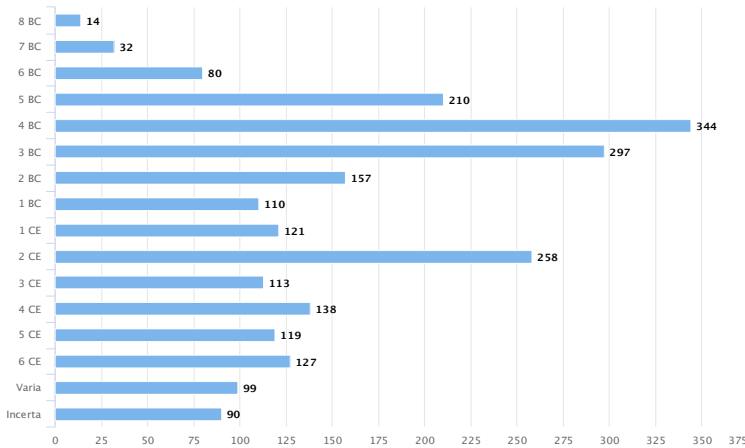
Figure 1.1. TLG authors by century (8 BC – 6 CE with *varia* and *incerta*)

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47   These statistics, based on data that I collected in the first half of 2018, are available at http://www.dfhg-project.org/Fragmentary-Texts.

48   As of 2021, the individual one year online TLG subscription costs $140. Costs of the institutional subscription depends on the size of the institution (total number of FTEs) and the number of anticipated users.

49   Bozzi (1986); Berkowitz/Squitier (1990) (on the TLG *Canon*); Brunner (1991); Brunner (1993); Brunner (1994); Reggiani (2017) 210–222.

50   Pantelia (2000).

Since the beginning, the TLG has addressed the problem of including lost authors. According to the *Canon*, the TLG lists authors "represented by some form of text that owes its provenance to codices, papyri, inscriptions, or quotations by later authors. There are, however, some authors who are lost except for the testimonia provided by later authors. [...] Some of these lost writers have, in fact, been assigned a place in the *Canon*, although there has not been a consistent effort to include every lost author mentioned in the surviving testimonia. [...] Entirely omitted from the *Canon*, however, are authors who are known to us only by way of anecdote or through recollected or (ostensibly) reported conversation. Such authors remain lost, and it is the anecdotist whose text resides in the data bank."[51] Luci Berkowitz and Karl Squitier clarify that the criterion for including lost authors in the TLG *Canon* depends on printed collections of fragments, where fragmentary authors may be represented by quotations (*fragmenta*), by references to their literary production and activity (*testimonia*), or only by titles.[52] In the CD-ROMs of the TLG, work titles were accompanied by codes identifying the means of *transmission* of texts, and the codes `Q` and `NQ` were used for `quotation` and `no quotation`: They stood for direct and indirect quotations, and for *testimonia* and titles.[53] This criterion is still reflected in the online version of the TLG, where there are no more codes for indicating the means of transmission of texts, but the field *Work Title* includes the forms *fragmentum*, *testimonium*, and *titulus*.[54] Examples are the *Fragmenta* of the comic author Aristophanes (`tlg0019.012–018`), the *Testimonia* of the historian Acusilaus (`tlg0392.001` and `003`), and the *Tituli* of the comic author Alexis (`tlg0402.004`).[55]

Considering this arrangement of texts and editions, it is possible to search the online version of the TLG with the string `fragm*` in the TLG field *All Fields* (which includes *Author*, *Editor*, *Work Title*, *Publ. Title*, *Series* and *Publ. Year*).

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51 Berkowitz/Squitier (1990) xiii.
52 For the treatment of fragmentary authors in printed editions and for the distinction between *fragmenta* and *testimonia*, see section 1.4.
53 Berkowitz/Squitier (1990) xxv–xxvi.
54 On the TLG work title *Fragmentum* or *Fragmenta*, see Berkowitz/Squitier (1990) xxiii. The online version of the TLG has *work classification* tags, which include also the forms *fragm.* and *test.* As for now, *fragm.* is used only for the fragments of Joannes Doceianus (`tlg3288.006`), while *test.* is used for the *Testimonia* published in 147 editions of different authors. On work classification tags and on the label *Test.* in the TLG *Canon*, see Berkowitz/Squitier (1990) xxviii and xlviii.
55 TLG authors have four-digit numbers, while TLG works have three-digit numbers. In the examples mentioned in the text, multiple works correspond to multiple editions. *Fragmenta* of Aristophanes are from seven editions and the *Testimonia* of Acusilaus from two editions. In the past, TLG fragmentary works (i.e., works not to be found in an independent text edition) had numbers with an x replacing the first of the three digits in the work number (e.g., the fragments of Erasistratus quoted by Galen: `tlg0690.x01`): see Berkowitz/Squitier (1990) xxii.

1.3 %

2.2 %

47.6 %

49.0 %

- TLG Authors
- TLG Fragmentary Authors (8 BC – 6 CE)
- TLG Fragmentary Authors (incerta)
- TLG Fragmentary Authors (varia)
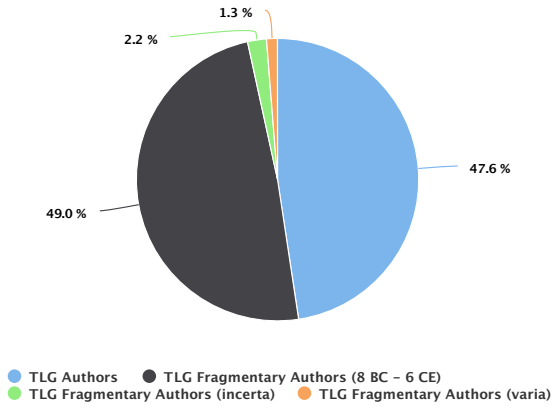
Figure 1.2. TLG authors (8 BC – 6 CE with *varia* and *incerta*)

17.8 %

82.2 %

- TLG Fragmentary Authors (fragmentary works)
- TLG Fragmentary Authors (extant and fragmentary works)
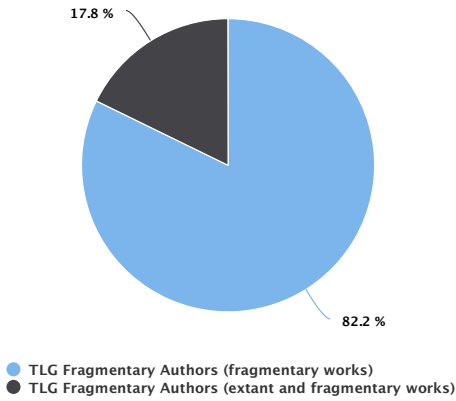
Figure 1.3. TLG fragmentary authors (8 BC – 6 CE with *varia* and *incerta*)

The search is not limited to the fields *Author* and *Work Title* because there are TLG fragmentary works without a *fragmentary* specification (e.g., the work title Κωμῳδούμενοι of a fragmentary comedy of the *Comica Adespota*: `tlg0662.008`). On the other hand, it is also necessary to eliminate works that are included in the results because the corresponding *Publ. title* has a form of the word *fragmentum* (e.g., Lysias' extant orations that are part of Christopher Carey's edition entitled *Lysiae orationes cum fragmentis*). For the period between the 8th century BC and the 6th century CE, the TLG counts 1,131 fragmentary authors + 29 *varia* and 50 *incerta*, for a total of 1,210 fragmentary authors (fig. 1.2). Within this group, there are 215 authors with both extant and fragmentary works, and 995 authors with only fragmentary works (fig. 1.3). Examples are authors like Sophocles, for whom we have both extant tragedies and fragmentary ones, and Hellanicus, who is known only through references and quotations in later texts.[56]

Table 1.1. TLG fragmentary authors and work titles (8 BC – 6 CE with *varia* and *incerta*)

Fragmentary Authors	1,210
Fragmentary Work Titles	2,314
Publ. Titles	489
Series	1

Table 1.1 shows that for the period between the 8th century BC and the 6th century CE (including *varia* and *incerta*) the TLG collects 1,210 fragmentary authors and 2,314 fragmentary work titles whose texts have been digitized from 489 editions. The TLG field *Series* includes only the entry *Poetarum Graecorum Fragmenta*. A deeper analysis reveals that there are other terms in the TLG field *Work Title* used for fragmentary works: *fragmentum*, *frustulum*, *epitome*, *excerptum*, *testimonium* and *titulus* with inflected forms. Table 1.2 shows the number of occurrences of these terms based on data filtered with the string `fragm*` in the TLG field *All Fields* and for the period of time between the 8th century BC and the 6th century CE (including *varia* and *incerta*).

For the same period of time, TLG fragmentary authors are classified according to 69 *epithets* grouped in 117 combinations:[57]

Alchemista, Alexandrinus, Apamensis, Apocrypha, Apologeta, Astrologus, Astronomus, Atticista, Biographus, Bucolicus, Caesariensis, Choliambographus, Comicus, Doxographus, Elegiacus, Encomiastica, Epicus, Epigrammaticus, Epistolographus, Evangelica, Geographus, Geometra, Gnomologus, Grammaticus, Hagiographa, Hexametrica, Hierosolymitanus, Historicus, Hymnus, Iambo-

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56 In the TLG Sophocles has seven tragedies (`tlg0011.011-017`) and *Fragmenta* (`tlg0011.008–010`), while under Hellanicus are grouped *Testimonia* (`tlg0539.001`) and *Fragmenta* (`tlg0539.002–003`).

57 TLG *author epithets* may also include geographical epithets or epithets attributed to works: Berkowitz/Squitier (1990) xvii–xix.

Table 1.2. TLG terms for fragmentary work titles (8 BC – 6 CE with *varia* and *incerta*)

Fragmentum	1,950
Testimonium	158
Titulus	119
Epitome	4
Excerptum	4
Frustulum	1

graphus, Judaeus, Junior, Lyricus, Magica, Mathematicus, Mechanicus, Medicus, Mimus, Mimographus, Musicus, Mythographus, Narratio Ficta, Naturalis Historia, Nomographus, Oraculum, Orator, Paradoxographus, Parodica, Parodius, Periegeta, Philosophus, Philologus, Poema, Poeta, Poeta Didacticus, Poeta Medicus, Poeta Philosophus, Polyhistor, Protector, Pseudepigrapha, Rhetor, Scholia, Scriptor Aenigmatum, Scriptor De Re Equestri, Scriptor Ecclesiasticus, Scriptor Eroticus, Sophista, Theologus, Tragicus.

TLG fragmentary authors are also classified according to 268 *geographical epithets* grouped in 313 combinations:[58]

Abderita, Adramyttenus, Aegaeus, Aegimius, Aegineta, Aegyptius, Aethiopis, Aetolus, Agrigentinus, Alabandeus, Alexandrinus, Alexandrinus (Troadis), Amasenus, Amasiotes, Amastrianus, Amathusiacus, Amidenus, Amisenus, Amorginus, Amphissensis, Ancyranus, Antiochenus, Apamensis, Aphrodisiensis, Aphroditensis (Aegypti), Apolloniates, Arabicus (Arabius), Arcadius, Arcas, Arelatensis, Argiva, Argivus, Arianus, Artemita, Ascalonius, Ascraeus, Aspendius, Assius, Atheniensis, Babylonius, Babylonius (Aegypti), Barcaeus, Benaeus, Bithynius, Boeotus, Borysthenius, Byblius, Byzantia, Byzantius, Caesariensis, Caesariensis (Cappadociae), Calactinus, Callatianus, Camirensis, Cappadox, Capreensis, Cardianus, Carrhaeus, Carthaginiensis, Caryandensis, Carystius, Cassandrensis, Cataneus, Ceus, Chaeronensis, Chalcedonius, Chalcidensis, Chalcidicus, Chersonesita, Chius, Citiensis, Citieus, Clazomeneus, Cnidius, Cnidius (Calliphon), Colophonius, Constantiensis (Cypri), Constantinopolitanus, Coptites, Corcyraeus, Corinthius, Cous, Cretensis, Creticus, Crotoniensis, Crotoniensis (Democedes), Cumaeus, Curiensis, Cydonius, Cyprius, Cyrenaeus, Cyrenensis, Cytherius, Cyzicenus, Damascenus, Delius, Delphicus, Dorylaeus, Elaita, Eleaticus, Eleus, Eleusinius, Emesenus, Ephesius, Epidauria, Epidaurius, Epiphaniensis, Epirota, Epirotes, Eresius, Eretriensis, Erythraeus, Euboeensis, Gabalensis, Gadarensis, Gaditanus, Gazaeus, Gelensis, Gelous, Halicarnassensis, Heracleensis, Heracleota, Heracleota (Ponti), Hermioneus, Hierapolitanus, Hierosolymitanus, Himeraeus, Iasensis, Iconiensis, Iliensis, Judaeus, Lacedaemonius, Lacon, Lampsacenus, Laodicensis, Larandensis, Larissaeus, Leontinus, Lepreates, Lerius, Lesbia, Lesbius, Leucadius, Lindia, Lindius, Locrus, Lucanus, Lugdunensis, Lycius, Lydius, Macedo, Magnes, Mallotes, Massiliensis, Mauretanicus, Mecybernaeus, Megalopolitanus, Megarensis, Megareus, Megaricus, Melius, Mendesicus, Messanius, Metapontinus, Methymnaeus, Milesius, Myndius, Myrleanus, Mysius, Mytilenensis, Naucratites, Nazianzenus, Neapolitanus, Neocaesariensis, Nicaeensis, Nicome-

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58   On TLG *geographical epithets*, see Berkowitz/Squitier (1990) xx–xxii.

diensis, Nilous, Nyssensis, Nyssenus, Oasites, Oeneius, Oenoandensis, Oenoensis, Olbiopolitanus, Olynthius, Orchomenius, Oxyrhynchites, Palaestinus, Palmyrenus, Panites, Panopolitanus, Panormitanus, Paphius, Paphlagonius, Parius, Patrensis, Pellaeus, Pergamenus, Petraeus, Phalereus, Pharsalius, Phaselinus, Philadelphius, Phliasius, Pieriota, Pitanaeus, Plataeeus, Ponticus, Prienaeus, Proconnensis, Prusensis, Pygelensis, Rheginus, Rhodius, Romanus, Salaminius, Samaritanus, Samius, Sardianus, Scarpheus, Scepsius, Seleuciensis, Selinuntius, Selymbrianus, Siceliota, Siculus, Sicyonia, Sicyonius, Sidetes, Sidonius, Sigeus, Sinopensis, Smyrnaeus, Soleus, Sphettius, Stagirites, Stymphalicus, Sybarita, Syracusanus, Syrius, Syrus, Tanagraea, Tarentinus, Tarsensis, Tauromenitanus, Tegeates, Teius, Telia, Telmessensis, Tenedius, Thasius, Theangelius, Thebaeus, Thebaïs, Thebanus, Theraeus, Thessalius, Thoricensis, Thurinus, Thurius, Thyatirius, Tragilensis, Trallianus, Troezenius, Tyanensis, Tyrius, Volsiniensis, Xanthius.

TLG fragmentary works are classified according to 69 *work classifications* grouped in 236 combinations:[59]

Alchemica, Apocalypsis, Apocrypha, Apologetica, Astrologica, Astronomica, Biographa, Bucolica, Catena, Chronographa, Comica, Commentarius, Coquinaria, Dialogus, Doxographa, Ecclesiastica, Elegiaca, Encomiastica, Epica, Epigrammatica, Epistolographa, Evangelica, Exegetica, Geographa, Gnomica, Grammatica, Hagiographa, Hexametrica, Historica, Homiletica, Hymnus, Hypothesis, Iambica, Ignotum, Invectiva, Legalia, Lexicographa, Liturgica, Lyrica, Magica, Mathematica, Mechanica, Medica, Metrologica, Mimus, Musica, Mythographa, Narratio Ficta, Naturalis Historia, Onirocritica, Oraculum, Oratio, Paradoxographa, Parodica, Paroemiographa, Periegesis, Philosophica, Physiognomonica, Poema, Polyhistorica, Pseudepigrapha, Rhetorica, Satyra, Scholia, Tactica, Testimonia, Theologica, Tragica, Typica.

Given that the TLG is an ongoing project and new authors, works, and editions are periodically added, this data is partly provisional, even if it mostly covers the current state of textual transmission. Moreover, literary and geographical classifications of authors and works are always problematic. Nevertheless, the goal of these statistics and numbers is to collect a first set of information concerning what is available online in a digital format and the kind of challenges and issues we have to deal with for new textual entries.

If we focus on historical fragmentary texts, which are the research question of this book, the TLG includes 273 fragmentary historians (based on the TLG author epithet `Hist.`) for the centuries 8 BC through 6 CE including *varia* and *incerta.* Moreover, if we take into account the TLG combination of the epithet `Hist.` with other epithets, there are 297 fragmentary historians (fig. 1.4):[60]

Abydenus (`0116`) Hist., Acesander (`1832`) Hist., Acusilaus (`0392`) Hist., Aelius Dius (`2434`) Hist., Aethlius (`0686`) Hist., Agaclytus (`0687`) Hist., Agatharchides (`2192`) Hist., Agathocles (`0688`) Hist., Agathon (`2566`) Hist., Agesilaus (`2555`) Hist., Aglaosthenes (`2345`) Hist., Agroetas (`1835`) Hist., Alcimus (`0695`) Hist., Alexarchus (`2556`) Hist., Alexis (`0707`) Hist., Amelesagoras (`2219`)

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59   On TLG *work classifications*, see Berkowitz/Squitier (1990) xxviii and xxxi–xlix.
60   Ciphers in round brackets are TLG four-digit numbers of authors: see p. 19 n. 55.
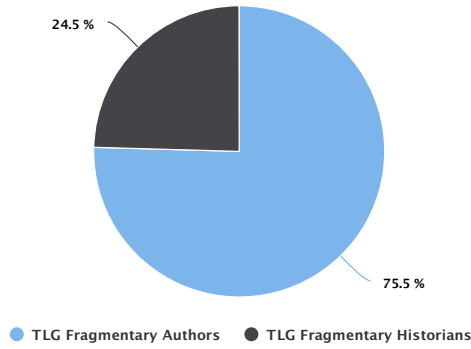
Figure 1.4. TLG fragmentary historians (8 BC – 6 CE with *varia* and *incerta*)

Hist., Amometus (2445) Hist., Anaxandridas (2284) Hist., Anaxicrates (2210) Hist., Anaximenes (0547) Hist. Rhet., Andreas (2393) Hist., Andriscus (2346) Hist., Androetas (2412) Hist., Andron (1123) Hist., Andron (2172) Hist., Andron (4347) Hist., Androtion (1125) Hist., Antenor (2322) Hist., Antigenes (1945) Hist., Antileon (2173) Hist., Antiochus (1145) Hist., Apollas (1162) Hist., Apollodorus (1164) Hist., Apollonius (1170) Hist., Appianus (0551) Hist., Aratus (2162) Hist., Archemachus (1174) Hist., Archinus (2418) Hist., Aretades (2193) Hist., Ariaethus (2215) Hist., Aristagoras (1190) Hist., Aristides (2194) Hist., Aristippus (2216) Hist., Aristobulus (2557) Hist., Aristocrates (1189) Hist., Aristocreon (2455) Hist., Aristocritus (2341) Hist., Aristodemus (1875) Hist. Myth., Aristodemus (2148) Hist., Aristonicus (1899) Hist., Aristophanes (1196) Hist., Armenidas (0360) Hist., Artemon (2307) Hist., Artemon (2392) Hist., Asclepiades (1199) Gramm. Hist., Asclepiades (2423) Gramm. Hist., Athanis (2387) Hist., Autesion (2205) Hist., Autocharis (2175) Hist., Autocrates (2204) Hist., Balagrus (1211) Hist., Basilis (1218) Hist., Bato (1219) Hist. Rhet., Berosus (1222) Astrol. Hist., Bion (1225) Hist., Bion (1871) Hist., Callippus (2270) Hist., Callisthenes (0534) Hist., Callixenus (1240) Hist., Capito (2506) Hist., Carystius (1245) Hist., Cassius Dio (0385) Hist. Rhet., Cephalion (1249) Hist. Rhet., Chaeremon (2424) Hist. Phil., Charax (1254) Hist., Charon (1258) Hist., Chrysermus (2195) Hist., Chrysippus (2559) Hist., Claudius Iolaus (1268) Hist., Clidemus (1276) Hist., Clitonymus (2190) Hist., Clitophon (1281) Hist., Clytus (1282) Hist., Conon (1285) Hist., Cornelius Alexander (0697) Polyhist., Craterus (1288) Hist., Crates (1289) Hist., Cratippus (1907) Hist., Creophylus (1291) Hist., Crito (1867) Hist., Critolaus (2552) Hist., Ctesias (0845) Hist. Med., Ctesiphon (2201) Hist., Daimachus (1908) Hist., Daimachus (2482) Hist., Damastes (1868) Hist., Damon (2273) Hist., Deilochus (2326) Hist., Demaratus (1812) Hist., Demetrius (0624) Hist. Phil., Demetrius (1917) Hist., Demetrius (2511) Hist., Demochares (1303) Hist. Orat., Democles (4390) Hist., Democritus (1305) Hist., Demon (1307) Hist., Dercyllus (2196) Hist., Dictys (1310) Hist., Dieuchidas (1313) Hist., Dinias (1314) Hist., Dinon (1316) Hist., Diodorus Siculus (0060) Hist., Diogenes (2328) Hist., Dionysius (1324) Hist., Dionysius (1328) Hist., Dionysius (2354) Hist., Dionysius (2466) Hist., Dionysius Halicarnassensis (0081) Hist. Rhet., Diophantus (2539) Hist., Dioscurides (2409) Hist., Diyllus (1911) Hist., Domitius

Callistratus (1239) Hist., Dosiadas (1338) Hist., Dositheus (1896) Hist., Duris (1339) Hist., Echephylidas (2289) Hist., Eparchides (1343) Hist., Ephorus (0536) Hist., Ergias (1354) Hist., Euagon (2372) Hist., Eudoxus (1915) Hist., Eumachus (1972) Hist., Eunapius (2050) Hist. Soph., Eutychianus (2158) Hist., Flavius Arrianus (0074) Hist. Phil., Gaius Acilius (2545) Hist. Phil., Gaius Asinius Quadratus (2122) Hist., Glaucus (2460) Hist., Glaucus (4391) Hist., Gorgias (2255) Hist., Gorgon (2357) Hist., Hagias-Dercylus (1387) Hist., Harmodius (1388) Hist., Hecataeus (0538) Hist., Hecataeus (1390) Hist., Hegesander (1392) Hist., Hegesippus (1397) Hist., Hellanicus (0539) Hist., Hellenica (0558) Hist., Heraclides (1406) Hist., Heraclides Lembus (1407) Hist., Hereas (2336) Hist., Herennius Philo (1416) Gramm. Hist., Hermaeus (2426) Hist., Hermesianax (2532) Hist., Hermias (2384) Hist., Hermippus (1421) Gramm. Hist., Herodorus (1427) Hist., Hestiaeus (1428) Hist., Hesychius Illustrius (2274) Hist., Hieronymus (1953) Hist., Hippias (1435) Hist., Hippostratus (2391) Hist., Hippys (1438) Hist., Hypermenes (2277) Hist., Hyperochus (2396) Hist., Idomeneus (1442) Hist., Ister (1450) Hist., Joannes Epiphaniensis (4392) Hist., Juba Ii Rex Mauretaniae (1452) Hist., Laetus (2525) Hist., Leo (1941) Hist., Leo (1978) Hist., Leo (2186) Hist., Lepidus (1459) Hist., Lucius Cincius Alimentus (2543) Hist., Lucius Licinius Lucullus (1977) Hist., Lyceas (1469) Hist., Lycus (1470) Hist., Lysanias (2298) Hist., Lysimachus (0574) Hist., Maeandrius (2339) Hist., Magica (5002) Magica Nat. Hist., Magnus (2157) Hist., Malchus (2582) Hist., Manetho (1477) Hist., Marcellus (2458) Hist., Megasthenes (1489) Hist., Melanthius (1491) Hist., Melisseus (2282) Hist., Memnon (1496) Hist., Menander (1498) Hist., Menander (4076) Protector Hist., Menecles (1499) Hist., Menecrates (1503) Hist., Menecrates (2475) Hist., Menecrates (4344) Hist., Menecrates (4345) Hist., Menecrates (4346) Hist., Menesthenes (1505) Hist., Menetor (4395) Hist., Menodotus (1506) Hist., Menyllus (2202) Hist., Metrodorus (1976) Hist., Metrophanes (2531) Hist., Mnesimachus (2565) Hist., Molpis (1516) Hist., Myron (1523) Hist., Myronianus (4397) Hist., Myrsilus (2331) Hist., Neanthes (1525) Hist., Nicander (2474) Hist., Nicias (2217) Hist., Nicocles (1534) Hist., Nicocrates (1535) Hist., Nicolaus (0577) Hist., Nonnosus (4393) Hist., Nymphis (1544) Hist., Nymphodorus (0578) Hist., Paeon (2512) Hist., Pamphila (1828) Hist., Parthax (1568) Hist., Patrocles (2479) Hist., Pausanias (2573) Hist., Phanodemus (1583) Hist., Phanodicus (2278) Hist., Pherecydes (1584) Hist., Philinus (1969) Hist., Philippus (1590) Hist., Philistus (1591) Hist., Phillis (2594) Hist., Philochorus (0583) Hist., Philomnestus (1598) Hist., Philostephanus (0584) Hist., Phylarchus (1609) Hist., Polybius (0543) Hist., Polycharmus (1623) Hist., Polycrates (1627) Hist., Posidonius (2187) Hist., Possis (2333) Hist., Potamon (1949) Hist., Praxagoras (2151) Hist., Priscus (2946) Hist. Rhet., Promathidas (2300) Hist., Promathion (2548) Hist., Protagorides (1636) Hist., Proxenus (1638) Hist., Ptolemaeus (1646) Hist., Ptolemaeus VIII Euergetes II (1645) Hist., Publius Herennius Dexippus (2141) Hist., Publius Rutilius Rufus (2546) Hist., Pyrander (2349) Hist., Pyrgion (1648) Hist., Pyrrhus (2160) Hist., Pythaenetus (1649) Hist., Pythermus (1651) Hist., Pythocles (2560) Hist., Quintus Fabius Pictor (2542) Hist., Satyrus (1661) Hist., Scamon (2330) Hist., Sextus Julius Africanus (2956) Hist. Scr. Eccl., Silenus (1970) Hist., Socrates (1678) Hist., Socrates (1679) Hist., Sophaenetus (1683) Hist., Sosicrates (1687) Hist., Sosthenes (2568) Hist., Staphylus (2182) Hist., Stesiclides (2171) Hist., Stesimbrotus (1923) Hist., Teucer (1704) Hist., Thallus (1706) Hist., Theagenes (1709) Hist., Themison (1713) Hist., Theodorus Anagnostes

(2869) Hist. Scr. Eccl., Theognis (2367) Hist., Theophanes (1981) Hist., Theophilus (2203) Hist., Theopompus (0566) Hist., Theotimus (1727) Hist., Theseus (1728) Hist., Thrasyllus (2428) Hist., Timachidas (1732) Hist., Timaeus (1733) Hist., Timagenes (1918) Hist., Timagetus (4396) Hist., Timagoras (2268) Hist., Timolaus (2533) Hist., Timonax (1736) Hist., Timonides (2386) Hist., Timotheus (2213) Hist., Uranius (2461) Hist., Xanthus (1751) Hist., Xenagoras (1752) Geogr. Hist., Xenion (1753) Hist., Xenomedes (2306) Hist., Zeno (2364) Hist.

Perseus Catalog. The *Perseus Digital Library* and the *Scaife Viewer* (open access) have no texts of fragmentary authors, but the *Perseus Catalog* collects information about editions of fragmentary authors and works. The *Perseus Catalog* was conceived in 2005 with the goal of collecting open bibliographic data and metadata about authors, works, and editions of Greek and Latin literature. Inspired by the FRBR model (*Functional Requirements for Bibliographic Records*), the *Perseus Catalog* aims at offering a complete view of the editorial and textual tradition of every work of Classical literature producing linked data and using standards for connecting its resources to bigger library systems and international data banks, as for example *WorldCat* and the *Virtual International Authority File* (VIAF).[61] The *Perseus Catalog* includes not only ancient Greek and Latin works, but also Arabic works, and it is browsable by *Author*, *Work Title*, *Work Original Language*, *Edition or Translation Year Published*, *Edition or Translation Language*, *Series* and *Subjects*. The catalog counts 2,072 authors and 4,584 work titles (table 1.3). The catalog offers also numbers for works in the original language, series, and subjects (table 1.4).

Table 1.3. *Perseus Catalog*: authors and work titles

Authors	2,072
Work Titles	4,584

Table 1.4. *Perseus Catalog*: works, series, and subjects

Ancient Greek Works (to 1453)	2,908
Latin Works	1,576
Arabic Works	131
Series	92
Subjects	1,072

Within the collection of the *Perseus Catalog*, there are 891 fragmentary authors, 1,060 fragmentary work titles, 971 Greek fragmentary works, 69 Latin fragmentary works, and 141 subjects pertaining to fragmentary works (table 1.5, figures

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61   Mimno/Crane et al. (2005); Babeu (2008); Babeu (2012); Babeu (2019).

1.5 and 1.6).[62] *Perseus Catalog* work titles include not only the term *fragmentum*, but also *testimonium* with inflected forms (table 1.6). As far as *Subjects* are concerned, the *Perseus Catalog* counts 884 fragmentary work titles classified as produced by historians of Greece (figure 1.7).

Table 1.5. *Perseus Catalog*: fragmentary authors and works

Fragmentary Authors	891
Fragmentary Work Titles	1,060
Fragmentary Works	1,040
	(971 Greek + 69 Latin)
Subjects	141

Table 1.6. *Perseus Catalog*: terms for fragmentary work titles

Fragmentum	1,060
Testimonium	38

As far as identifiers of Greek authors and works are concerned, the *Perseus Catalog* has been making use of the codes of the last printed edition of the TLG *Canon* by Berkowitz/Squitier (1990). *Perseus Catalog* entries have a main CITE URN identifier for authors and TLG identifiers for authors and works that are also part of *Perseus* CTS URNs for identifying works and editions.[63] As for fragmentary authors, an example is Hellanicus of Lesbos, who is identified with `urn:cite:perseus:author.701` and with `tlg0539`. Hellanicus' *Fragmenta* are cataloged with `urn:cts:greekLit:tlg0539.tlg001`.[64]

Given that both the online TLG and the *Perseus Catalog* are ongoing projects, there are cases where authors are not any more in the online TLG (but were

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62   Different figures of *works* and *work titles* depend on *Perseus Catalog* MODS records that include both uniform official work titles and a list of alternative titles or translated titles found within a record. An example is represented by the fragments of Istros the Callimachean (`urn:cite:perseus:author.776`), where the table of contents of the MODS file includes the titles *Atthis*, *Fragmenta incertae sedis*, *Apollinis apparitiones*, *Ptolemais*, *Aegyptiorum coloniae*, *Argolica*, *Eliaca*, *Collectio sacrificorum creticorum*, *De proprietate certaminum*, *Melopoei*, *Commentarii*, *Dictiones atticae* and *Incertorum operum fragmenta* from the section of the author's fragments in the *Fragmenta Historicorum Graecorum* (FHG): https://github.com/PerseusDL/catalog_data/blob/master/mods/greekLit/tlg1450/tlg004/opp-grc1/tlg1450.tlg004.opp-grc1.mods1.xml.

63   On *Perseus Catalog* identifiers and on the use of the *CITE Architecture*, see section 3.2.

64   See http://catalog.perseus.org/catalog/urn:cite:perseus:author.701 and http://catalog.perseus.org/catalog/urn:cts:greekLit:tlg0539.tlg001. The further specification `opp-grc1` in the *Perseus Catalog* identifies the fragments of Hellanicus in the edition of the FHG. In the TLG *Canon*, the codes `001`, `002`, and `003` identify the *testimonia* and the *fragmenta* of Hellanicus in the FGrHist and in Mette (1978) 11–12.

43.0 %

57.0 %

● Perseus Catalog Authors   ● Perseus Catalog Fragmentary Authors

Figure 1.5. *Perseus Catalog*: fragmentary authors

1.4 %

21.0 %

77.5 %
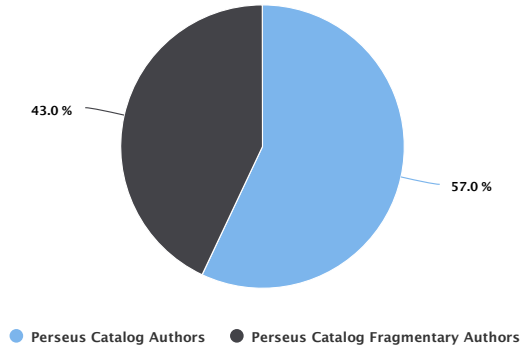
● Perseus Catalog Works   ● Perseus Catalog Greek Fragmentary Works
● Perseus Catalog Latin Fragmentary Works
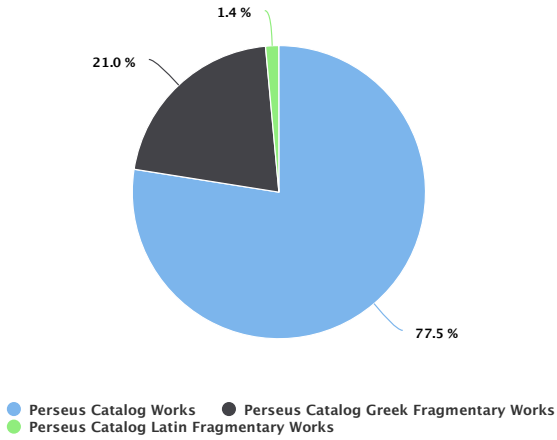
Figure 1.6. *Perseus Catalog*: fragmentary works
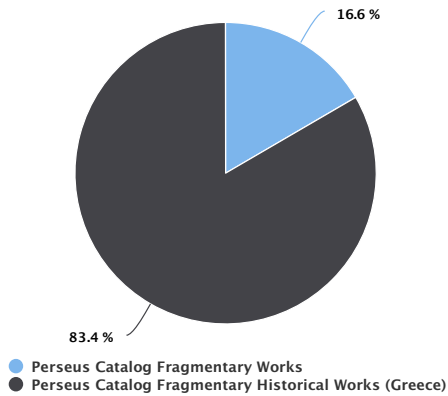
Figure 1.7. *Perseus Catalog*: fragmentary historical works

present in the printed edition of the *Canon* and therefore are still in the *Perseus Catalog*) and other cases where authors collected in the *Perseus Catalog* are not existing in the online TLG.

An example of the first case is Amphion of Thespiae, who is a Greek fragmentary historian published in the FHG (IV 301) and in the FGrHist (387 = BNJ 387). This author was originally available in the printed edition of the TLG *Canon* with the number `tlg2271` and the letter `Q` as a mean of transmission, but is not present in the online TLG.[65] The *Perseus Catalog* preserves his TLG record.[66]

As far as the second case is concerned, an example is Nicander of Alexandria, who was published in the FHG (IV 462) and in the FGrHist (1112). The author has been never published in the TLG and is therefore included as `fhg0480` in the *Perseus Catalog*.[67]

Another interesting example is represented by the historian Acestodorus of Megalopolis, who was originally inserted in the printed edition of the TLG *Canon* as `tlg1818`. The author is mentioned in a *scholion* to Sophocles' *Oedipus Coloneus* that preserves also two fragments of Istros the Callimachean and Andron of Halicarnassus.[68] The printed edition of the TLG *Canon* gives this information and in fact identifies Acestodorus' fragment as `tlg1818.x01` adding a

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65 On the TLG codes `Q` and `NQ` for fragmentary authors, see p. 19. On Amphion in the printed edition of the *Canon*, see Berkowitz/Squitier (1990) 19.

66 See http://catalog.perseus.org/catalog/urn:cite:perseus:author.1537. The author has only one fragment from Athenaeus' *Deipnosophists* (14.26 = 629a).

67 http://catalog.perseus.org/catalog/urn:cite:perseus:author.1960

68 *Schol. Soph. Oed. Col.* 1053 = FGrHist 334 F 22 = Berti (2009b) F 22a = BNJ 334 F 22a = FGrHist and BNJ 10 F 13. Acestodorus is commented in FHG II 464 under Cineas Thessalus.

reference to Istros.[69] This author is not any more in the online TLG, but is collected in the *Perseus Catalog* with the original TLG number.[70]
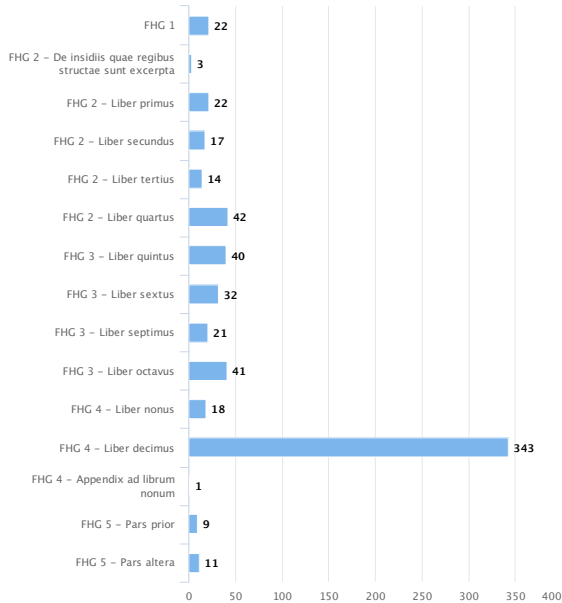
Figure 1.8. DFHG fragmentary authors

Open Greek and Latin (OGL). The *Open Greek and Latin* (OGL) (open access) is a project developed at the University of Leipzig for digitizing editions of Greek and Latin sources produced in antiquity through the 6th century CE. The goal is to generate OCR outputs that are encoded according to the TEI XML Guidelines and are freely downloadable and reusable. OGL has been digitizing also fragmentary authors and is making available a first limited set of editions of fragmentary works through a GitHub repository (`fragm-dev`): https://github.com/OpenGreekAndLat in/fragmentary-dev.

First One-Thousand Years of Greek (First1KGreek). The *First One-Thousand Years of Greek* (First1KGreek) (open access) is a project maintained by the *Open and Greek Latin* (OGL) in collaboration with the Center for Hellenic Studies, the Harvard Library, Mount Alison University, Tufts University, the University of Leipzig and the University of Virginia.[71] The goal of this project is to collect at least one edition of every Greek work composed between Homer and 250 CE

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69   Berkowitz/Squitier (1990) 1. On the use of the letter x in the TLG *Canon* for numbers of fragmentary works, see p. 19 n. 55.
70   See http://catalog.perseus.org/catalog/urn:cite:perseus:author.8 (`tlg1818`).
71   Muellener (2019).

FHG Volumes	FHG Books	FHG Sections	FHG Dates	FHG Authors
FHG 1				22
FHG 2	De insidiis quae regibus structae sunt excerpta			3
	Liber primus	Inde ab incunabulis artis historicae usque ad finem Belli Peloponnesiaci	520-404 BC	22
	Liber secundus	Inde a fine Belli Peloponnesiaci usque ad tempora Alexandri Magni		17
	Liber tertius	Aristoteles ejusque discipuli		14
	Liber quartus	Reliqui scriptores qui floruerunt inde ab Alexandri temporibus usque ad mortem Ptolemaei Philadelphi	336-247 BC	42
FHG 3	Liber quintus	A Ptolemaeo III Evergete usque ad finem Ptolemaei VI Philometoris sive usque ad eversionem Corinthi	247-146 BC	40
	Liber sextus	Ab eversione Corinthi usque ad Caesarem Augustum	146-27 BC	32
	Liber septimus	Ab Augusto usque ad Trajanum	27 BC - 98 CE	21
	Liber octavus	A Trajano usque ad Constantinum Magnum	98-306 CE	41
FHG 4	Liber nonus	A Constantino Magno usque ad Phocam imperatorem	306-602 CE	18
	Liber decimus	Scriptores aetatis incertae ex ordine literarum		343
	Appendix ad librum nonum			1
FHG 5	Pars prior			9
	Pars altera			11

Figure 1.9. Chronology of authors in the FHG

with a focus on texts that do not already exist in the *Perseus Digital Library*. The First1KGreek includes 882 editions with 30 fragmentary work editions.

Jacoby Online. Jacoby Online (JO) (subscription required) is a project developed by Brill publishers to produce a digital version of *Die Fragmente der griechischen Historiker* (FGrHist) and its *continuatio*, and to publish a new edition of the FGrHist through the *Brill's New Jacoby* (BNJ).[72]

Digital Fragmenta Historicorum Graecorum (DFHG). The DFHG (open access) provides the digital edition of the *Fragmenta Historicorum Graecorum* (FHG) by Karl Müller (see chapter 4). It collects 636 Greek fragmentary historians, who are searchable through the DFHG *Fragmentary Authors Catalog* (see section 4.4.1). The FHG doesn't provide dates for each author, but arranges the content in 15 sections within 5 volumes according to general chronological classifications (figg. 1.8 and 1.9).

1.4 Fragmentary Texts and Printed Editions

Classical philologists born in the "Gutenberg galaxy" — and therefore working in a print culture — have been devising complex structures and typographical

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72 On the FGrHist and its continuation, see pp. 35 ff. On the *Jacoby Online* and its components, see section 2.1.2. The BNJ has been publishing online a bit less than 2,000 authors. For a list of correspondences among authors published in the FGrHist and in the BNJ, see the *Müller-Jacoby Table of Concordance* of the *Digital Fragmenta Historicorum Graecorum* project, which is constantly updated as soon as new BNJ authors are published (section 4.4.3).

strategies for publishing printed critical editions of Greek and Latin sources. A walk through the shelfs of a specialized library and an online search in *Google Books* show how many different examples of printed editions of primary sources of Classical antiquity have been produced in the last five centuries. Since the experiments of Aldus Manutius in Venice up to very recent products of publishing companies, the technology of the printed book has played a fundamental role in producing and shaping forms of critical collections, arrangements, and editions of information and knowledge about historical texts.[73]

The digital revolution has been affecting textuality in a dramatic way and also Classical philologists are now faced with new questions about representing their data in a digital environment.[74] In this regard digital philology has two main goals: 1) preserve the editorial heritage of the past by digitizing printed editions and generating machine readable and structured outputs, and 2) produce a new digital scholarly model for editing primary sources and publishing new born-digital editions. In this scenario, digital philologists have the responsibility of preserving the understanding of traditional print conventions and criteria in order to transfer this editorial heritage to a computational format.[75] At the sime time and while never abandoning the rigor of well established methods, the responsibility of digital philologists is to become independent of the print model in order to create a new digital scholarly environment and avoid the risk of producing digital replica of printed editions.

This is also valid for editions of fragmentary authors and works, and this is the aim of the two projects that will be described in chapters 4 and 5. In the following pages I present an overview of printed editions of ancient Greek fragmentary historians, focusing on the two big collections edited by Karl Müller and Felix Jacoby (including its *continuatio*) and on the volumes of the Italian series *I Frammenti degli Storici Greci*.[76]

The five volumes of the *Fragmenta Historicorum Graecorum* (FHG) were edited by Karl Müller with the help of Theodor Müller and Victor Langlois, and printed in Paris between 1841 and 1873 by the publisher Ambroise Firmin-Didot.[77] The FHG is a collection of excerpts from many different sources preserving information and text reuses about 636 ancient Greek fragmentary historians. Excluding the first volume, authors are chronologically distributed and cover a period

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73 See McLuhan (2011) and Borsuk (2018). On the importance of Aldus Manutius and his editions of Classical texts, see Davies (1999), Marzo Magno (2012), Beltramini/Gasparotto (2016), Wilson (2017) 141–183, and Marzo Magno (2020). On textual scholarship, see McDonald/Suarez (2002) and Eliot/Rose (2007). On the future of text, see also Hegland (2020).

74 Bolter (2001); Mordenti (2001); Fiormonte (2003); Mordenti (2011); Sahle (2013); Apollon/Bélisle et al. (2014); Pierazzo (2015).

75 Cf. McGann (2014) and Borsuk (2018).

76 For editions of Greek fragmentary historians before Karl Müller, see p. 128 n. 4.

77 Petitmengin (1983); Grafton (1997).

of time from the 6th century BC through the 7th century CE.[78] In FHG I, critical commentaries about the life and the intellectual activity of authors (*testimonia*) are published at the beginning of the volume in a section entitled *De vita et scriptis auctorum*. From FHG II onwards, introductory commentaries are printed at the beginning of the section of each author or group of authors.[79] There are also authors without an introduction but only with a collection of *fragmenta*, and authors who have only an introduction discussing *testimonia* about them and not a collection of *fragmenta*.[80]

Müller doesn't provide a formal distinction between *testimonia* and *fragmenta* like Jacoby in the FGrHist — where the letters T and F clearly separate the two kinds of sources — but inserts *testimonia* into the introductions to authors, and only the *fragmenta* represent a seperate section with a numerical arrangement.[81] There are also cases where Müller summarizes the content of the fragments in a section called *Argumentum*.[82] Under each FHG author section, fragments are arranged by fragmentary works and in a sequence that depends on historiographical and philological decisions of the editor.[83] Figure 1.10 shows the first page of the section about Hecataeus of Miletus with numbered fragments.[84] After the Greek title of a fragmentary work (e.g., Περίοδος γῆς) and a possible work section (e.g., A. Εὐρώπη), there is the number of the fragment (e.g., 1), a reference to the witness of the fragment (e.g., Herodot. IV, 36), the text of the fragment itself extracted from the source text of the witness, and sometimes also

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78 For a detailed description of the content of this edition, see section 4.1.

79 Examples of groups of authors are Dionysodorus Boeotus and Anaxis Boeotus (FHG II 84), who have only *testimonia* and not *fragmenta*, and the Androncs (FHG II 346–352: Andron Ephesius, Andron Tejus, Andron Halicarnassensis, and Andron Alexandrinus).

80 An example of an author without an introduction is Ptolemaeus Euergetes II (FHG III 186–189). Examples of authors without fragments are Cadmus Milesius (FHG II 2–4) and Psaon Plataeensis (FHG III 198).

81 Exceptions are Strabo Amasensis (FHG III 490–491), Dexippus Atheniensis (FHG III 667), Eunapius Sardianus (FHG IV 9–10), Priscus Panites (FHG IV 70), Malchus Philadelphensis (FHG IV 111–112), Petrus Patricius (FHG IV 183–184), and Bardesane (FHG V 61–62), who have separate sections entitled *Testimonia*. On different types of *testimonia* about authors and works, and on the problem of distinguishing between *testimonia* and *fragmenta*, see Laks (1997), part. 237: "La couple fragment/témoignage fait partie de l'appareil critique primaire de tous les historiens de l'Antiquité, quel que soit le domaine considéré." A further example is the collection of the fragments of the Presocratic philosophers edited by Diels/Kranz (1959–1960), who separate not only *testimonia* (A: *Leben und Schriften*) and *fragmenta* (B: *Fragmente*), but also passages of texts influenced by fragmentary philosophers (C: *Imitationen*).

82 See Pherecydes (FHG I 70), Eunapius Sardianus (FHG IV 10–11), Priscus Panites (FHG IV 70–71), Malchus Philadelphensis (FHG IV 112), Petrus Patricius (FHG IV 184), and Menander Protector (FHG IV 200–201).

83 When fragments can't be attributed to a fragmentary work, they are collected in sections entitled *fragmenta incerta*, *fragmenta incertae sedis*, *fragmenta incertorum operum*, etc.

84 FHG I 1–31.

a short Latin commentary.[85] Latin translations of work titles and fragments are printed in the lower part of the page. FHG fragments may include more than one witness under the same number, while in other cases related witnesses are separated with different letters attached to the same fragment number.[86] Fragment numbers can be also accompanied by other characters like parentheses, square brackets, and question marks which mean that Müller contests, suggests, or doubts the attribution of a fragment to a certain author.[87]

Figure 1.10. Hecataeus of Miletus, FHG I 1

Given that the FHG includes a wide range of authors and works, there are parts of the collection with different layouts. For example, in FHG I the chapters of the *Bibliotheca* of Apollodorus are printed in two columns with the Greek text on the left and the Latin translation on the right.[88] Müller doesn't produce a crit-

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85   In many other cases works are divided into books with headings like *liber primus*, *liber secundus*, etc. See, for example, the books of the *Atthis* of Philochorus: FHG I 384–410.

86   An example of the first case is fr. 161 of Ephorus (FHG I 276), which includes source texts from both the *Suda* and Harpocration. An example of the second case is fr. 221 of Theopompus (FHG I 315), which has two different witnesses numbered as fr. 221a and fr. 221b. On problems concerning the treatment of this kind of fragments in the DFHG, see p. 151 n. 51.

87   See, for example, FHG I 1, frr. 5 (?) and 7 (?); 56, fr. (83); II 14, fr. (5); 29, fr. [2]; 34, fr. [22]; 361, frr. (4) and (5). On the representation of these characters, see p. 151 n. 52.

88   FHG I 104–179.

ical apparatus for the text of the *fragmenta*, excluding those fragments that are *excerpta* from manuscripts. Examples are Diodorus Siculus, Polybius, and Dionysus of Halicarnassus at the beginning of FHG II, Nicolaus of Damascus in FHG III, and John of Antioch in the appendix of FHG IV and in FHG V.[89] FHG I includes also the text of the *Marmor Parium* (with Latin translation, chronological table, and commentary) and the Greek text of the *Marmor Rosettanum* (with a French literal translation as well as a critical, historical, and archaeological commentary).[90] FHG V has a different structure because it is divided into two parts. The first part has fragments of Aristodemus, Eusebius, Priscus, John of Antioch, John Malalas, Critobulus, Photius, the author of the Periplus of the Euxine Sea, and Dionysius of Byzantium, while the second part has only the French translation of eleven authors with Greek and Syrian historical fragments preserved in Armenian sources.[91] Each volume of FHG I–IV has a *praefatio* (except for vol. III), an *index nominum et rerum*, an *index auctorum*, an *index titulorum*, and *addenda et corrigenda*. The two parts of FHG V have two distinct prefaces and final indices of names.[92]

The fifteen volumes of the first three parts of *Die Fragmente der griechischen Historiker* (FGrHist) were edited by Felix Jacoby and printed by the publisher Brill between 1923 and 1958: *Part I. Genealogie und Mythographie, Part II. Zeitgeschichte, Part III. Geschichte von Städten und Völkern (Horographie und Ethnographie)*.[93] Authors are numbered sequentially within groups arranged by literary genres, and the organization of the collection is much more complex than the *Fragmenta Historicorum Graecorum* (FHG).[94] The FGrHist has a formal distinction between *testimonia* (T) and *fragmenta* (F), and the text of fragments is provided with a critical apparatus, but not with a translation into a modern language. Introductions to authors and commentaries to fragments are printed in separate volumes.[95] Jacoby groups fragments under work titles and book numbers, when this kind of information is available in the source texts, otherwise he

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89   FHG II vii–xlii; FHG III 343–464; FHG IV 535–622; FHG V 27–39. On different kinds of authors and texts collected in the FHG, see section 4.3.1.1.

90   FHG I 533–590 and 1–42 (with a separate pagination at the end of the volume). On the two inscriptions and their inclusion in the DFHG project, see sections 4.5 and 4.6.

91   See pp. 158 ff.

92   A few additions and annotations to the FHG were published in a short text by Dorschel (1873).

93   A summary of the structure of the FGrHist by Mortimer Chambers is available at http://dx.doi.org/10.1163/1873-5363_boj_aorganisation_fgrhist.

94   See Jacoby (1909) (with an English translation in Jacoby (2015), which is based on Jacoby (1956) 16–63). On the life of Jacoby and his scholarly contribution, see the text of Mortimer Chambers at http://dx.doi.org/10.1163/1873-5363_boj_abiografie_jacoby. See also Chambers (2009) and other papers in Ampolo (2009) and Chávez Reino (2009).

95   FGrHist III B and its supplement (b) have also separate volumes of notes to commentaries of fragments.

classifies them as of uncertain location. He also prints with spaced-out letters those parts of the fragments that seem to be direct quotations.[96] Volumes are accompanied by introductions, tables of contents, *addenda*, *delenda* and *corrigenda*, cross-references, concordances with the FHG, and *indices auctorum*.[97] Commentaries of the collection are in German, except for the supplement of volume B of Part III which is in English (*A Commentary on the Ancient Historians of Athens*).[98]
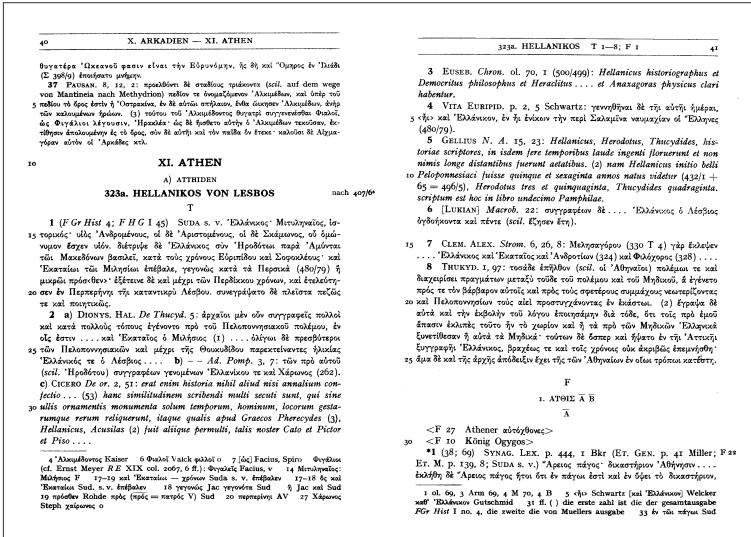
Figure 1.11. Hellanicus, FGrHist 323a 40–41

Figure 1.11 shows the first page of Hellanicus at the beginning of the section of the fragmentary local historians of Athens (FGrHist III B). In this part of the collection Hellanicus has the number 323a with 8 *testimonia* and 29 *fragmenta*. Testimonies and fragments of Hellanicus are also printed in other parts of the FGrHist because the author is classified according to different literary genres: nr. 4 (30 *testimonia* and 202 *fragmenta*) in FGrHist I (genealogy and mythography); nrs. 601a (2 *fragmenta*), 608a (7 *fragmenta*), 645a (1 *fragmentum*), and 687a (3 *testimonia* and 11 *fragmenta*) in FGrHist III (under local histories of Thessaly, Egypt, and Persia). In these different sections, the same source texts that preserve *testimo-*

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96 On the editorial practices of the FGRHist, see http://dx.doi.org/10.1163/1873-5363_boj_aed itorial_practices.

97 Further additions and notes to the FGrHist have been provided by Mette (1978), Mette (1979–1980), and Mette (1985). Complete indices of fragmentary historians and source texts of FGrHist fragments have been published by Bonnechère (1999) with description and review by Marincola (2000).

98 As a companion to this part of the FGRHist, see Jacoby (1949). On the genesis of this volume, see Chambers (1990).

nia and *fragmenta* of Hellanicus are frequently printed more than once because their evidence covers different categories devised by Jacoby for classifying ancient Greek fragmentary historians.[99] This situation is reflected in the *Thesaurus Linguae Graecae* (TLG) online, which follows the printed edition of the FGrHist and therefore reprints the same source texts when repeated by Jacoby in different parts of his collection.[100] Going back to figure 1.11, information in round brackets after the number of *testimonia* and *fragmenta* includes cross-references to other fragments in the FGrHist and correspondences with fragment numbers of the FHG. Lines of the texts of fragments are numbered and referenced to in the critical apparatus at the bottom of the page. Further elements in the page may include fragmentary work titles and book numbers (in ancient Greek), and chronological data.

Figure 1.12. FGrHist Continued IV A, Fascicle 1 40–41

Given that Felix Jacoby didn't finish his monumental work, this task has been inherited by other scholars. Charles Fornara published the first fascicle of the commentary to FGrHist III C,[101] Pierre Bonnechère compiled the indices to FGrHist I–III,[102] while an international team has been working on publishing two other parts of the collection which were planned by Jacoby but never accomplished

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99 For example *Suda* [E 739] s.v. Ἑλλάνικος is T 1 in both FGrHist 4 and 323a. The text of Harpocr. s.v. Παναθήναια is printed both as 4 F 39 and as 323a F 2. Athen., *Deipn.* 15.25 (= 679f–680c) is printed as 4 F 54–55 and as 608a F 2.
100 On this problem for dealing with fragmentary texts in digital libraries, see p. 55.
101 Fornara (1994).
102 Bonnechère (1999).

(FGrHist Continued): Part IV on *Biography and Antiquarian Literature* edited by Guido Schepens and Stefan Schorn, and Part V on *Die Geographen* edited by Hans-Joachim Gehrke and Felix Maier. A few fascicles of Part IV have been already published as printed volumes, while the rest is currently being made available online before the final printed publication.[103] The online publication is part of the *Jacoby Online* project that includes also the *Brill's New Jacoby* (BNJ) edited by Ian Worthington, which is a "fully-revised and enlarged edition" of the FGrHist.[104] One of the aims of the continuation of Jacoby's FGrHist is to make more accessible the philological and historiographical complexity of textual remains of fragmentary authors. This is one of the reasons why fascicles of Part IV have an English translation of each fragment, and commentaries and notes are printed together with *testimonia* and *fragmenta* and not in separate volumes (fig. 1.12).[105] To distinguish the FGrHist Continued from the work of Jacoby, numbering of authors of FGrHist Part IV starts from 1000 and numbers of authors of FGrHist Part V starts from 2000.[106]
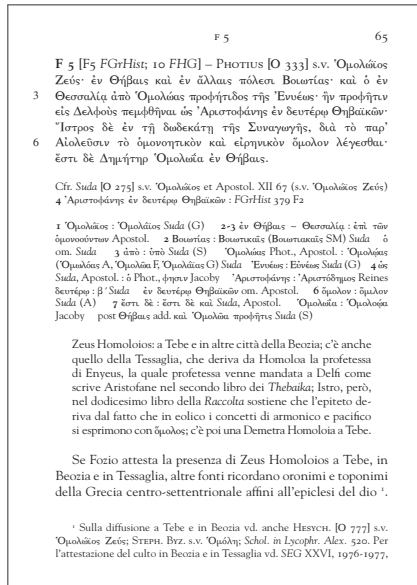
Figure 1.13. *I Frammenti degli Storici Greci*: Istro il Callimacheo, 65

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103 Cf. Schepens (1997) and Schepens (1998).

104 Worthington (2005). See section 2.1.2 on the *Jacoby Online*, the BNJ, and the CD–ROM version of the FGrHist.

105 See Schepens (1998) xii–xiv, who describes also the three typographical styles used for distinguishing 1) verbatim excerpts (expanded modus, *Sperrdruck*), 2) paraphrase or an indirect or abridged reference (normal typeface), and 3) doubtful parts (*petit druck*).

106 Schepens (1998) xiv.

The Italian series *I Frammenti degli Storici Greci* directed by Eugenio Lanzillotta is publishing monographs on single authors and sections originally collected by Felix Jacoby in the FGrHist.[107] The books of the series follow the traditional way of publishing fragmentary texts in printed editions. They include a distinction between *testimonia* and *fragmenta*, which are accompanied by *loci paralleli*, a critical apparatus, a translation into Italian, and a historical commentary. The ancient text of testimonies and fragments is provided with an extensive context, in order to help readers understand the reasons of the textual reuse.[108] Commentaries have footnotes and volumes include also bibliographies, concordances, and indices of names and sources.[109] In general, *testimonia* and *fragmenta* follow the sequence of the FGrHist, but the goal of the series is to supplement and extend whenever possible the work of Jacoby by reviewing his work and adding new fragments discovered after his publication.[110] Figure 1.13 shows an example of one of the fragments of Istros the Callimachean.[111] The number of the fragment is always accompanied, when available, by a reference to the corresponding number of the FGrHist and of the FHG. Given the amount of witnesses for each fragmentary author and given that the scope of the series is to provide historical commentaries, the critical apparatus is not based on new examinations of manuscripts, papyri, and other primary surces, but on a selection of the most important readings published in other editions.[112] The goal of the historical commentary is to focus on the context of the fragment and on the roles of the quoting author who has preserved it.

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107 Lanzillotta (2009).
108 On the importance of the context of fragmentary texts, see section 2.3.
109 For a discussion of the characteristics of the printed volume of Berti (2009b), see sections 2.1.3 and 2.2.
110 Lanzillotta (2009) 289 and 292.
111 Berti (2009b) 65.
112 This is the same editorial criterion followed for the fascicles of FGrHist Continued Part IV: see Schepens (1998) xiii.

2 Fragmentary Texts and the Digital Revolution

This chapter describes how fragmentary authors and works are represented in the first generation of digital libraries. It also analyzes how hypertextual models have been developing a new dimension, where textual fragments are envisioned as *text reuses* preserved in *contexts* that cover and therefore hide their original form. The first section (2.1) presents the relationship between digital scholarship and textual fragments by describing how fragmentary texts are currently collected and published in digital libraries that still depend on the printed editorial practice. The section introduces digital projects that include Greek and Latin fragmentary texts, devotes specific attention to the *Thesaurus Linguae Graecae* (2.1.1) and to the *Jacoby Online* (2.1.2) with the example of the edition of the fragments of Istros the Callimachean (2.1.3), and presents digital collections of physical fragments such as inscriptions, papyri, and manuscripts that bear textual evidence (2.1.4). The second section (2.2) describes how editions of fragmentary authors and works are representations of hypertexts and how hypertextual theories in literature and digital media are important for a new publishing model of fragmentary texts in a digital environment. The last section (2.3) presents the concept of *cover-text* that has led philologists to move the attention from decontextualized fragments to the role of the context that preserves quotations and reuses of lost texts. Parallel to this is the implementation of computational techniques for *text reuse* detection that are now also applied to historical data (2.3.1). Given that they are strictly connected to text reuse, the two last sections focus the attention on intertextual analysis (2.3.2) and translation alignment (2.3.3), whose methods are beginning to be experimented with literary texts and historical documents.

2.1 Digital Scholarship and Textual Fragments

The digital revolution has been affecting primary and secondary textual sources of Greek and Latin works.[1] The first generation of digital libraries has converted into a machine readable format the reconstructed text of single editions of Classical works. The goal of the second generation of digital libraries is to publish multiple editions of the same work, reproduce the critical apparatus and all other paratextual elements (prefaces, introductions, indices, bibliographies, notes, etc.), and generate collaborative environments for new born-digital critical editions of Greek and Latin sources.[2] Fragmentary authors and works are directly involved in this process because they consist of quotations and text reuses preserved by still surviving sources. The problem is that the model according to which fragmentary texts are currently represented in digital libraries is not satisfactory, because it strongly depends on printed editorial practices. In the following pages, I describe varieties of this model according to the most important collections of Greek and Latin sources.

As far as ancient Greek sources are concerned, the *Thesaurus Linguae Graecae* (TLG) is the most extended digital library that also includes many editions of fragmentary authors and works. Given the huge amount of TLG texts and the importance of the TLG *Canon*, I refer to section 2.1.1 for a more specific and detailed analysis of the TLG treatment of fragmentary texts in its databank. The *Perseus Digital Library* and the new *Scaife Viewer* don't contain editions of fragmentary authors and works, but the *Open Greek and Latin* (OGL) project has been offering a first set of digitized versions of printed editions of fragmentary authors and works. In this case, the goal is to generate OCR outputs with a basic TEI XML encoding of printed editions in order to produce machine readable files that allow scholars to create digital versions of printed books and extract data for many different purposes. An example is constituted by the *Digital Fragmenta Historicorum Graecorum* (DFHG) that will be described in chapter 4. A project specifically focused on producing digital editions of Greek fragmentary authors is Brill's *Jacoby Online*, which is continuing in a digital format the work started by Felix Jacoby one century ago for collecting evidence of lost Greek historians. Considering its

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1 Berti (2019a).
2 Babeu (2011) part. 2–3 on "several generations of digital corpora in Classics"; Apollon/ Bélisle et al. (2014); Pierazzo (2015); Boschetti (2018) 11–12. On the concept of *paratext*, see Genette (1982) 9 and *passim*; Berti (2012) 444.

specificity, the project will be discussed in section 2.1.2.[3] As for Latin literature, PHI *Latin Texts* is one of the electronic databases of Greek and Latin sources produced by the *Packard Humanities Institute*.[4] PHI *Latin Texts* is a digital archive of 836 Latin works from 362 authors up to 200 CE with a selection of sources from later antiquity. The *Canon* of the PHI *Latin Texts* offers an overview of authors and works that are part of the collection with references to the printed editions on which digital texts are based: http://latin.packhum.org/canon. Authors and works are identified with numbers and abbreviations. For example, Marcus Tullius Cicero is [0474 Cic] and Cicero's *In Catilinam* (ed. A.C. Clark 1905) is [0474 013 Cic].[5]

  PHI *Latin Texts* includes collections of fragmentary authors, such as the *Historicorum Romanorum Reliquiae* (HRR) by Hermann Peter.[6] An example are the fragments of the Latin *Annales* of Fabius Pictor [0061 001 hist].[7] In this case, PHI reproduces the text of only three of the six Latin fragments of Fabius Pictor originally edited by Peter under the section *Fabii Pictoris Latini Annales* (3, 4, and

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3 On these projects see also section 1.3. There are other still in progress plans for producing digital editions of single Greek fragmentary authors or groups of authors belonging to specific genres, as for example the fragments of Protagoras of Abdera by Tazuko van Berkel at Leiden University, the fragments of Demetrius of Scepsis by Alexandra Trachsel at the University of Hamburg, the fragments of Sceptic philosophers by Stéphane Marchand at the École Normale Supérieure de Lyon, and the fragments of ancient Greek rhetoric and oratory by Jan Heßler at the University of Würzburg. Another project is the collection and edition of fragments and testimonies of historians from late antiquity at the University of Düsseldorf, where they are producing printed editions with an online version. The project is still in beta version and has been conceived as a traditional printed critical edition with a parallel online presence: see Fischer (2017) 267–268.

4 These databases were originally published as CD-ROMs. PHI 5.3 was a collection of Latin texts now freely accessible at http://latin.packhum.org: see Kozák (2018). PHI 7 was a database of Greek inscriptions and documentary papyri. Greek inscriptions are online at https://inscriptions.packhum.org, while documentary papyri are part of *Papyri.info*. On PHI *Greek Inscriptions*, see p. 69.

5 The *Canon* of the PHI is now ingested in a new project for publishing and curating critical editions of Latin texts, which is under development as the *Digital Latin Library* (DLL) and which is also going to include fragmentary authors and works: https://digitallatin.org. The HTML code of the PHI *Canon* embeds tags and attributes that can be used for extracting data and reusing it for other purposes. The DLL has extracted this data and integrated it in its catalog, which is a *Linked Open Data* (LOD) resource built according to the best practices of library information science: https://catalog.digitallatin.org. For example, Marcus Tullius Cicero is cataloged as DLL #A5129 and its entry is available at https://catalog.digitallatin.org/dll-author/a5129. For a presentation of the DLL project, see Huskey (2019) and *Digital Latin Library Project* (2021).

6 Peter (1870–1914).

7 See https://latin.packhum.org/author/61. This data is ingested in the DLL Catalog with a DLL identifier (DLL #W2649): https://catalog.digitallatin.org/dll-work/w2649. Fragments of Fabius Pictor have been encoded in TEI XML as part of the *Digital Fabius Pictor* project developed at the University of Leipzig as a result of a collaboration between the Institute of Computer Science and the Historical Seminar: see Straßburger (2018).

Figure 2.1. PHI: Fabius Pictor, fragments of the *Latini Annales*

6).[8] Moreover, PHI doesn't publish the critical apparatus, the commentary, and the context of the witnesses as Peter does, but reproduces only the words that can be attributed to the original lost texts of Fabius Pictor (fig. 2.1).

An identical treatment of the Latin fragments of the *Annales* of Fabius Pictor is available in the *Bibliotheca Teubneriana Latina* (BTL) and in the *Library of Latin Texts* Series A (LLT–A). The BTL online provides electronic access to all printed editions of the *Bibliotheca Teubneriana Latina* with a database that includes about 13 million word forms.[9] The BTL publishes the same portions of fragments 3, 4, and 6 as in PHI *Latin Texts* (fig. 2.2). It allows to export a PDF file with the text of the fragments and also different citation formats with a permanent URL.[10] The *Library of Latin Texts* Series A (LLT–A) is part of a cluster of full-text Latin databases and dictionaries which contains over 78 million Latin words from more than 3,800 works attributed to ca. 1,200 authors.[11] LLT–A provides the same portions of fragments 3, 4, and 6 of Fabius Pictor as in PHI *Latin Texts* and in the BTL, and allows users to export a PDF file with information about the author, the texts, and the reference edition (figg. 2.3, 2.4, and 2.5).[12] PHI *Latin Texts* includes under the name of Fabius Pictor also the fragments of the *Iuris Pontificis Libri* (`[0061 002 iur]`) according to the edition *Iurisprudentiae Anteiustinianae Reliquiae* by P.E. Huschke, E. Seckel, and B. Kübler (vol. I, 1908). LLT–A collects

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8   Peter (1870–1914) I 112–113 (Greek fragments are at 5–39). PHI seems to publish only the fragments that Peter attributed to Quintus Fabius Pictor and not those that he questioned as being of Numerius Fabius Pictor. On these problems of attribution, see also FHG III 80–93, FGrHist (BNJ) 809, Cornell (2013) I 163–166, and Woodman (2015) 4–22.

9   The BTL is accessible only through a library subscription at https://doi.org/10.1515/btl.

10   See https://www.degruyter.com/document/database/BTL/entry/AFAPIANNA/html. For the fragments of the *Iuris Pontificis Libri*, see below.

11   The project started in 1991 and the collection is now accessible with an institutional subscription on the BREPOLiS website. Since 2009, LLT–A is supplemented by LLT Series B.

12   See http://clt.brepolis.net/LLTA/pages/TextSearch.aspx?key=AFAPIANNA_.

some of these fragments (*Iuris Pontificis fragmenta*) under *Fabius Pictor quidam (an potius Quintus Fabius Maximus Seruilianus)*, but according to the edition of Peter (1870–1914) I 114–116.

Fabius Pictor quidam
Annalium fragmenta (in aliis scriptis seruata)
De Gruyter | 2011

Entry Type	publication
Entry Language	Latin
Author	Fabius Pictor quidam [fragmenta in aliis scriptis seruata]
Work	Annalium fragmenta (in aliis scriptis seruata)
Aetas	Antiquitas
Genre	prosa
TLL Code	FAB. PICT. hist.
LLA	LLA 157

Saeculum

Century	s. 2 a.c. (dubium)
Chronology	8

Memento

Fabius Pictor quidam [fragmenta in aliis scriptis seruata]

s. II a. Chr. ?

Annalium fragmenta (in aliis scriptis seruata) – s. 2 a.c. (dubium) – prosa

LLA 157 – TLL FAB. PICT. hist.

Teubner (H. Peter, 2da ed. 1967) [Historicorum Romanorum reliquiae, vol. I], p. 112–113

Summa formarum: 22

Summa formarum dissimilium: 22

Hinweise

Die Fragmente 3, 4 und 6 wurden aufgenommen.

Notes

Fragments 3,4 and 6 are included.

Table of Contents ▾

fragm. 3, p. 112 l. 7

et simul uidebant picum Martium.

fragm. 4, p. 113 l. 3

spelunca Martis

fragm. 6, p. 113 l. 11

Quapropter tum primum ex plebe alter consul factus est, duouicesimo anno postquam Romam Galli ceperunt.

Source

Title	Bibliotheca Teubneriana Latina (BTL) Online
Edited by	De Gruyter
Publisher	De Gruyter	2009

Figure 2.2. BTL Online: Fabius Pictor, fragments of the *Latini Annales*

Musisque Deoque is a digital archive of Latin poetry from its origins to the Italian Renaissance supported by a critical and exegetical electronic apparatus. The collection includes also fragmentary works, as for example the fragments of Quintus Ennius. Figure 2.6 shows lines 105–109 (book 1) of the *Annales*. The text is based on the edition of Otto Skutsch (*The Annals of Quintus Ennius*, 1985) and has been manually digitized by Paolo Mastandrea and Silvia Arrigoni.[13] The page provides the critical apparatus, references to the source texts (with concordances to the editions of Johannes Vahlen and Enrico Flores), complete bibliographical and

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13 In this case the permalink is http://www.mqdq.it/texts/ENN|anna|105. Texts and critical notes of the edition of Otto Skutsch have been digitized and are now available online on the website of the *Oxford Scholary Editions Online* (OSEO) service (subscription required) (fig. 2.8).

Figure 2.3. LLT–A: Fabius Pictor, fragments of the *Latini Annales*

Figure 2.4. LLT–A: Fabius Pictor, fragments of the *Latini Annales* (background on the text)

Figure 2.5. LLT–A: Fabius Pictor, fragments of the *Latini Annales* (PDF export)

textual-critical information, and the metrical scansion of the Latin text through *Pede certo*.

Figure 2.6. *Musisque Deoque*: Quintus Ennius, *Annales*, ll. 105–109

As far as Latin fragments are concerned, I also point to *Grammatici disiecti: sources fragmentaires pour l'histoire de la grammaire latine* (https://gradis.hyp otheses.org/). The project is directed by Alessandro Garcea and is "a research blog dedicated to gathering, for the first time, all Latin grammatical texts which are preserved exclusively in fragmentary form." The "primary purpose is to publish bio-bibliographical sketches of the authors of such texts, be they grammarians, teachers, erudite writers or any other author who may have written works on grammar, regardless of their position in society or their linguistic activity."[14] According to the description, *Grammatici disiecti* provides through a WordPress website a list of Latin fragmentary grammarians dated between the 3rd century BC and the 4th century CE. As soon as they are ready, the project publishes separate pages with complete bio-bibliographical presentations of the authors of the collection.

Beyond the projects mentioned in these pages, there are also other resources for accessing in many different ways digital versions of printed editions of fragmentary authors and works. For example, publishing companies have been offering this kind of service through online subscriptions for individual and institutional customers. The *Digital Loeb Classical Library* offers "an interconnected, fully searchable, perpetually growing, virtual library of all that is important in Greek and Latin literature."[15] The online collection counts more than 520 vol-

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14 A new edition of the corpus is in preparation for *Les Belles Lettres* editions (*Collection des Universités de France*). As part of an interest in Latin grammarians, the project is connected to the *Corpus Grammaticorum Latinorum* (CGL): see Garcea/Cinato et al. (2010).

15 See https://www.loebclassics.com. As of 2021, the annual subscription for individual users is priced at $170 for the first year and $70 for subsequent consecutive years. Prices for academic and public libraries depend on the size of the institutions interested in the subscription.

umes of Latin, Greek, and English texts, which are available in an interface that allows readers to browse, search, bookmark, annotate, and share content. The Loeb online has also editions of fragmentary works, as for example the Greek epic fragments published by Martin West in 2003 (fig. 2.7).[16] Other examples that are accessible with a subscription or direct payment are the *Oxford Scholarly Editions Online* (OSEO), that enables readers to search across the texts, navigate through reference forms and look up words in the *Oxford Latin Dictionary* (fig. 2.8),[17] or the online *Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana* that has put online PDF files of its editions including fragmentary authors and works.[18]

Figure 2.7. *Digital Loeb Classical Library*: M.L. West, *Greek Epic Fragments*

A different kind of service is offered by mass digitization projects like *Google Books*, *Internet Archive*, and *HathiTrust*, which have been giving free access to millions of scanned copies of books that are in the public domain. These collections contain also many volumes about Classical sources, allowing scholars to *rediscover* past editions of ancient authors that comprise fragmentary ones.[19]

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16   West (2003).

17   https://www.oxfordscholarlyeditions.com

18   https://www.degruyter.com/serial/BT-B/html

19   For a selection of ancient Greek and Latin texts in *Google Books*, see https://www.google.com/googlebooks/ancient-greek-and-latin.html. On how *Google Books* is "reshaping" the way scholars do research, see Findlen (2013) and Graham/Milligan et al. (2016) 38–44.

Figure 2.8. OSEO: O. Skutsch (ed.), *The Annals of Quintus Ennius*, ll. 105–109

Needless to say that this is the first step toward an extraordinary contribution to the preservation of an inestimable patrimony of past scholarship, which is often neglected, not only because it is considered old and out-of-date, but also because in many cases it is difficult to locate and consult in traditional libraries. An example, among many others, is represented by the five volumes of the *Fragmenta Historicorum Graecorum* (FHG) that will be described in chapter 4. These projects offer not only the possibility to consult and read scholarly printed editions, but also to get source files for experimenting with Optical Character Recognition (OCR) techniques. As for ancient Greek sources, this kind of experimentation is being performed by the *Open Greek and Latin* (OGL) project and by *Lace: Greek OCR*, which is directed by Bruce Robertson at Mount Allison University.[20] The project has an online catalog with an updated list of OCRed texts including editions of fragmentary authors and works. Through the list, it is possible to access single books, visualize the alignment of the image of each page with its OCR stages, download the relevant files, and also contribute with manual OCR post-correction.

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20 On OGL, see p. 30. On OCR for ancient Greek and on *Lace: Greek OCR*, see Robertson (2019).

2.1.1 Thesaurus Linguae Graecae (TLG)

As I mentioned in chapter 1, since the beginning the TLG has addressed the problem of dealing with lost authors in the *Canon* and in the online collection. As far as the catalog and the publication of textual fragments are concerned, the TLG follows standards and conventions of printed editions of fragmentary authors and works.[21] An example is the fragmentary historian Hecataeus of Miletus, who corresponds to `tlg0538`. In the TLG Hecataeus is classified as *historicus*, is dated between the 6th and the 5th century BC (6–5 B.C.), and has the geographical epithet *Milesius*. In this case, the reference edition is FGrHist 1 and the TLG follows the arrangement of Felix Jacoby with his distinction between 25 *testimonia* (`tlg0538.001`) and 373 *fragmenta* (`tlg0538.002`).[22]

HECATAEUS Hist.
6-5 B.C.
Hist.
Milesius

Select all   Submit

1. **Testimonia {0538.001}** ☐ (Click to select) | ⮕
Test.
F. Jacoby, *Die Fragmente der griechischen Historiker (FGrH) #1*, Leiden: Brill, 1923-1958 (repr. 1954-1969): 1A:1-7, *1 addenda.
Word Count: 2,273

2. **Fragmenta {0538.002}** ☐ (Click to select) | ⮕
Hist., Myth., Perieg.
F. Jacoby, *Die Fragmente der griechischen Historiker (FGrH) #1*, Leiden: Brill, 1923-1958 (repr. 1954-1969): 1A:7-47, *1-*4 addenda.
Word Count: 11,068

3. **Fragmenta {0538.003}** ☐ (Click to select) | ⮕
Hist.
H.J. Mette, "Die `Kleinen' griechischen Historiker heute," *Lustrum* 21 (1978): 6.
Word Count: 77
⊟ Breakdown
   fr. 145 bis a-b

                                                                          Submit

Figure 2.9. TLG: Hecataeus Milesius (`tlg0538`)

The TLG adds two other witnesses to Jacoby's fragment 145 that were published by Hans Joachim Mette as 145bis (a and b) (`tlg0538.003`).[23] Figure 2.9 shows the pop-up window of Hecataeus with bibliographic references and the word count of the texts of testimonies and fragments, excluding the apparatus criticus and the commentary that are not reproduced in the TLG. Figures 2.10 and 2.11 show how Hecataeus' fragment 145bis was originally published by Mette and how is replicated in the online TLG, which closely reproduces the layout of the printed page and adds symbols to mark lines in its files: `l1` marks the line with the reference to the witness until the colon, `1` marks the line with the Greek text of the

---

21 For a list of epithets and work classifications that identify fragmentary authors and works belonging to different literary genres in the TLG, see pp. 21 and 23.

22 For the *fragmenta* of Hecataeus, the TLG provides further classifications (*Historica*, *Mythographa*, and *Periegesis*).

23 Mette (1978) 6.

fragment, and `@1` stands for *page end*.[24] The TLG provides a link to cite the page with the edition of Mette, which incorporates author and work numbers (`0538` and `003`): http://stephanus.tlg.uci.edu/Iris/Cite?0538:003:0 (fig. 2.12).[25] As part of the online TLG services, it is also possible to perform morphological analyses and obtain statistics about the words of the texts of the fragments (see below).

Figure 2.10. Mette (1978) 6 = Hecataeus, FGrHist 1 F 145bis

Figure 2.11. TLG: Hecataeus, FGrHist 1 F 145bis = Mette (1978) 6

Figure 2.12. TLG: link to cite Hecataeus, FGrHist 1 F 145bis = Mette (1978) 6

Another example is Hellanicus of Lesbos, who is represented in a similar way in the TLG with a reproduction of the *testimonia* and the *fragmenta* from the FGrHist and Mette (1978). In this case, the TLG allows users to select fragments from the different FGrHist sections of Hellanicus arranged by Felix Jacoby, and

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24 `@1`: "marks end of page in source text regardless of whether page is part of the citation system. All files end in @1". This method seems to be not consistent in the TLG corpus. Cf. the example of Hellanicus below.

25 On TLG author and work numbers, see p. 19 n. 55. The TLG doesn't provide identifiers for single fragments: in this case, `003` refers to the edition of Mette and not specifically to fragment 145bis with its two witnesses.

there is also a specific reference to fragments on papyrus (figs. 2.13 and 2.14).[26] As far as the layout of the FGrHist page is concerned, the TLG tries to replicate it. Figures 2.15 and 2.16 show how Hellanicus' fragments 2–5 (FGrHist 323a) are represented in the printed edition of Jacoby's FGrHist and in the online TLG. The TLG reproduces the text of the fragments including references to other source texts and follows the FGrHist in printing with spaced-out letters those parts of the fragments that seem to be direct quotations (cf. p. 36). Missing elements are the critical apparatus and therefore line numbers for the text of the fragments, references in round brackets to the corresponding numbers of the fragments in other parts of the FGrHist and in the FHG, references in angle brackets to other fragments of the same FGrHist section, chronological data in the margin of the page, and references to fragmentary work titles (in this case Ἀτθίς) and to book numbers (in this case B) according to which fragments are arranged in the collection.

Figure 2.13. TLG: Hellanicus (`tlg0539`)

Considering that the TLG is not only a digital collection of texts but also a catalog of ancient Greek works based on printed editions, it would have been better to include at least the reference to fragmentary work titles and book numbers provided by Felix Jacoby, because they are a fundamental element to understand

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26 PSI X 1173; P.Oxy. X 1241; P.Giss. 307v; fr. 133bis (= P.Oxy. XXVI 2442). It is not clear the criterion used by the TLG for selecting these papyri, because there are other fragments of Hellanicus preserved on papyrus but not mentioned in the breakdown: FGrHist 4 F 19b (P.Oxy. VIII 1084), F 68 (P.Oxy. XIII 611), and F 197bis (= PSI XIV 1390). There is also an inscription among the *testimonia*: FGrHist 4 T 30 (IG II/III^2 2363). On the evidence of these physical fragments, see section 2.1.4.

Volume–Jacoby#–F 1a,4,F fragment 1a line 1 GO
3b,323a,F
3b,601a,F
3c,608a,F
3c,645a,F
3c,687a,F

v | **Next**

HELLANICUS, *Fragmen*

1a,4,F.

(1a) SCHOL. APOLL. RHOD. III 1179: περὶ τῆς Κάδμου εἰς Θήβας
παρουσίας Λυσίμαχος ἐν τῆι Συναγωγῆι τῶν Θηβαικῶν Παραδόξων (III)
ἱστορεῖ, καὶ Ἑλλάνικος ἐν ᾱ Φορωνίδος, ἱστορῶν ὅτι καὶ τοὺς ὀδόντας
ἔσπειρε τοῦ δράκοντος κατὰ Ἄρεως βούλησιν, καὶ ἐγένοντο πέντε ἄνδρες
ἔνοπλοι, Οὐδαῖος Χθόνιος Πέλωρ Ὑπερήνωρ Ἐχίων. **(1b)** — III 1186:
τοὺς περιλειφθέντας ἐν τῆι μάχηι ἐν σὺν Κάδμωι κατοικῆσαι ἐν Θήβας ἔσπει-
ρεν, ἐκ δὲ αὐτῶν πέντε ἄνδρες ἔφυσαν, Οὐδαῖος Χθόνιος Ὑπερήνωρ Ἐχίων
Πέλωρος. καὶ ὁ μὲν Ἑλλάνικος μόνους φησὶ <τούτους> βεβλαστηκέναι. @1 (5)
(2) ATHENAI. IX 410 F: τὸν δὲ τῶι χερνίβωι ῥάναντα παῖδα διδόντα
κατὰ χειρὸς Ἡρακλεῖ ὕδωρ, ὃν ἀπέκτεινεν ὁ Ἡρακλῆς κονδύλωι, Ἑλλάνικος
μὲν ἐν ταῖς Ἱστορίαις Ἀρχίαν φησὶ καλεῖσθαι· δι᾽ ὃν καὶ ἐξεχώρησε
Καλυδῶνος. ἐν δὲ τῶι δευτέρωι τῆς Φορωνίδος Χαιρίαν αὐτὸν ὀνομάζει
Ἡρόδωρος δ᾽ ἐν ἑπτακαιδεκάτηι τοῦ καθ᾽ Ἡρακλέα λόγωι (31 F 3) Εὔνομον. (5)
καὶ Κύαθον δὲ τὸν Πύλητος μὲν υἱόν, ἀδελφὸν δὲ Ἀντιμάχου ἀπέκτεινεν
ἄκων Ἡρακλῆς οἰνοχοοῦντα αὐτῶι, ὡς Νίκανδρος ἱστορεῖ ἐν δευτέρωι Οἰται-
κῶν (F 17 Schn.), ὧι καὶ ἀνεῖσθαί φησι τέμενος ὑπὸ τοῦ Ἡρακλέους ἐν
Προσχίωι, ὃ μέχρι νῦν προσαγορεύεσθαι Οἰνοχόου.
(3) HARPOKR. SUID. s. Στεφανηφόρος· ... Στεφανηφόρου ἡρώων,
ὣς ἔοικεν, ἦν ἐν ταῖς Ἀθήναις. εἴη δ᾽ ἂν ὁ Στεφανηφόρος ἤτοι τῶν

Figure 2.14. TLG: Hellanicus' *fragmenta* (`tlg0539.002`)

Figure 2.15. Hellanicus, FGrHist 323a 42

Volume-Jacoby#-F 3b,323a,F ▼ fragment 2 ▼ line 1   **GO**

Prev | Next

HELLANICUS, *Fragmenta.* {0539.002} 🔖

λο[υμένην *] / αρτιδ[.] ἐ(πὶ) Πτερί(ην) πρὶν τ[*] / Πτερία δ(ὲ) καλεῖτ(αι) ἡ
μη[*] / θεν εἰ(ς) Πτερί[αν *] / εἰ(ς?) Κάρυσσαν δ(ὲ) ἔπλευσ[ε *] / οἱ ἐν *(10)*
Περσίδι κ(αὶ) οἱ ἄλλ[η *] / πρὶν ἂν ὀφ[θῆι ἱ]ερ[ὸν] ἀκρ[εμόνα] / Ἀθην(αί)οις ἐκεῖ
γ(ὰρ) .[*] / τ(ῆς) ἀλογίας (?) ἢ Ἀθη[νᾶ *] / ων ἀ(πὸ) Αἰξ(ω)ν(ῆς?) ἐκει*** @1
(201 ter) NATAL. COM. *Myth.* 7, 2 (p. 706 ed. Genev.): *fuit enim
poetarum consuetudo, ut fluvios tauri similes effingerent, quoniam cum impetu irrum-
pentes tauris similem edant mugitum; vel ut Hellanicus sensit, quia terram sulcare
tanquam boves apparent; vel ut aliis placuit, quia circa ripas fluminum tauri mugire
ob uberiora pascua audiantur. (5)*
(202) JOSEPH. AJ I 107 (EUSEB. P E IX 13 p. 415 D): Ἡσίοδος
τε καὶ Ἑκαταῖος (1 F 35) καὶ Ἑλλάνικος καὶ Ἀκουσίλαος (2 F 46) καὶ
πρὸς τούτοις Ἔφορος (II) καὶ Νικόλαος (II) ἱστοροῦσι τοὺς ἀρχαίους ζή-
σαντας ἔτη χίλια.

3b,323a,F.

(1*) SYNAG. LEX. p. 444, 1 Bkr
Ἄρειος πάγος· δικαστήριον Ἀθήνησιν ....
ἐκλήθη δὲ Ἄρειος πάγος ἤτοι ὅτι ἐν πάγωι ἐστὶ καὶ ἐν ὕψει τὸ δικαστήριον, @1
Ἄρειος δέ, ἐπεὶ τὰ φονικὰ δικάζει, ὁ δὲ Ἄρης ἐπὶ τῶν φόνων· ἢ ὅτι ἔπηξε
τὸ δόρυ ἐκεῖ ὁ Ἄρης ἐν τῆι πρὸς Ποσειδῶνα ὑπὲρ Ἁλιρροθίου δίκηι, ὅτε *(5)*
ἀπέκτεινεν αὐτὸν βιασάμενον Ἀλκίππην, τὴν αὐτοῦ καὶ Ἀγραύλου τῆς Κέκρο-
πος θυγατέρα, ὥς φησιν Ἑλλάνικος ἐν ᾱ.
(2) HARPOKR. s.v. Παναθήναια· Δημοσθένης Φιλιππικοῖς (4,
35). διττὰ Παναθήναια ἤγετο Ἀθήνησι, τὰ μὲν καθ' ἕκαστον ἐνιαυτόν, τὰ δὲ
διὰ πενταετηρίδος, ἅπερ καὶ μεγάλα ἐκάλουν· Ἰσοκράτης Παναθηναικῶι (12,
17) .... ἤγαγε δὲ τὴν ἑορτὴν πρῶτος Ἐριχθόνιος ὁ Ἡφαίστου,
καθά φησιν Ἑλλάνικός τε καὶ Ἀνδροτίων (324 F 2), ἑκάτερος *(5)*
ἐν ᾱ Ἀτθίδος. πρὸ τούτου δὲ Ἀθήναια ἐκαλεῖτο, ὡς δεδήλωκεν Ἴστρος
ἐν ̄γ τῶν Ἀττικῶν (334 F 4).
(3) HARPOKR. s.v. Φορβαντεῖον· Ὑπερείδης ἐν τῶι Κατὰ
Πατροκλέους (F 145 Bl—Je.). ὅτι τὸ Ἀθήνησι Φορβαντεῖον ὠνομάσθη ἀπὸ
Φόρβαντος βασιλεύσαντος Κουρήτων καὶ ὑπ' Ἐρεχθέως ἀναιρεθέντος, δεδήλω-
κεν Ἄνδρων ἐν ̄η τῶν Συγγενειῶν (10 F 1). ἦν δὲ Ποσειδῶνος υἱὸς ὁ
Φόρβας, καθά φησιν Ἑλλάνικος ἐν ᾱ Ἀτθίδος. *(5)*
(4) PHOT. BEROL. p. 53, 21 Rei (SYNAG. LEX. p. 362, 24
Bkr): Αἷμον τὸ ὄρος οὐδετέρως· Ἑκαταῖος διὰ παντὸς (1 F 167) καὶ Διονύ-
σιος (687 F 3) καὶ Ἑλλάνικος ἐν ᾱ Ἀτθίδος καὶ Τίμαιος (566 F 76)
καὶ Εὔδοξος (p. 75 Gis.).
(5a) HARPOKR. (SUDA; SCHOL. DEMOSTH. 18, 107a) s.v.
Μουνυχία· Δημοσθένης ἐν τῶι Ὑπὲρ Κτησιφῶντος (18, 107). τόπος παρα-
θαλάσσιος ἐν τῆι Ἀττικῆι. Ἑλλάνικος δὲ ἐν ̄β Ἀτθίδος ὠνομάσθαι φησὶν ἀπὸ
Μουνύχου τινὸς βασιλέως τοῦ Πανταικλέους. **(5b)** SCHOL. DEMOSTH. 18, 107b:
Μουνυχία τόπος περὶ τὸν Πειραιᾶ, ἔνθα ἐστὶν ἱερὸν Μουνυχίας Ἀρτέμιδος .... @1

Figure 2.16. TLG: Hellanicus' *fragmenta* (FGrHist 323a)

the content of the fragments and the editorial structure of the FGrHist.[27] Nevertheless, the online TLG provides a very powerful search engine and useful tools for performing morphological analyses and getting statistics and n-grams, which represent an invaluable addition to printed editions of ancient source texs. For example, by selecting the word Ἀτθίδος in F 2 of Hellanicus (FGrHist 323a), it is possible to get not only the morphological analysis of the word with links to the entry in different lexica (LSJ, MiddleLS, and DGE), but also statistics about the use and the distribution of the word in the TLG corpus: A summary of the use of the lemma (fig. 2.17), its distribution by century, its relative distribution by century (fig. 2.18), its highest use by author, and its relative distribution by author. The TLG provides also *work statistics* and in this case, for example, it is possible to visualize results for the FGrHist fragments of Hellanicus reproduced in the TLG (`tlg0539.002`) (fig. 2.19).[28]

Summary

- This lemma is attested in the corpus 745 times
- Its highest attestation by century is: A.D.2 ((93)), 4 B.C. (86), Varia (80)
- The highest use is found in authors: PHILOCHORUS, STEPHANUS Byzantius, HARPOCRATION, Aelius HERODIANUS et Pseudo-HERODIANUS, NONNUS, EUSTATHIUS Thessalonicensis, HELLANICUS, ANDROTION, SUDA, ANTHOLOGIA GRAECA, PHOTIUS, ATHENAEUS, PAUSANIAS, Georgius CHOEROBOSCUS, COMMENTARIA IN DIONYSII THRACIS ARTEM GRAMMATICAM
- The highest use is found in works: PHILOCHORUS, *Fragmenta* {0583.002}, HARPOCRATION, *Lexicon in decem oratores* {1389.002}, NONNUS, *Dionysiaca* {2045.001}, HELLANICUS, *Fragmenta* {0539.002}, ANDROTION, *Fragmenta* {1125.003}, SUDA, *Lexicon* {9010.001}, STEPHANUS Byzantius, *Ethnica* {4028.001}, ANTHOLOGIA GRAECA, *Anthologia Graeca* {7000.001}, PAUSANIAS, *Graeciae descriptio* {0525.001}, ATHENAEUS, *Deipnosophistae* {0008.001}, Aelius HERODIANUS et Pseudo-HERODIANUS, *De prosodia catholica* {0087.001}, EUSTATHIUS Thessalonicensis, *Commentarii ad Homeri Odysseam* {4083.003}, Georgius CHOEROBOSCUS, *Prolegomena et scholia in Theodosii Alexandrini canones isagogicos de flexione verborum* {4093.002}, STEPHANUS Byzantius, *Ethnica (Libri A-I)* {4028.003}, EUSTATHIUS Thessalonicensis, *Commentarii ad Homeri Iliadem* {4083.001}

Figure 2.17. TLG: statistics for the lemma Ἀτθίς, -ίδος, ἡ (summary)

These examples, even if limited to historians, show how fragmentary authors and works are accessible through the TLG. The same dependency on the printed editorial practice is evident if we examine fragmentary authors belonging to other literary genres in the TLG. Moreover, one of the downsides of this structure of the TLG is the fact that the corpus has duplicates of texts. This phenomenon is intrinsic to scholarship of fragmentary literature, because "a collection of frag-

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27   To our knowledge, titles (*tituli*) of fragmentary works are present in the TLG if they are the unique evidence of a fragmentary work: cf. p. 19. As for fragmentary historians, an example is the TLG author Promathidas (`tlg2300`) with one *titulus* (Ἡμίαμβοι: `tlg2300.003`) from Lloyd-Jones/Parsons (1983) 345.

28   It is also possible to get statistics for the entire corpus of Hellanicus or only for the FGrHist *testimonia* (`tlg0539.001`) and for the *fragmentum* published by Mette (1978) (`tlg0539.003`).
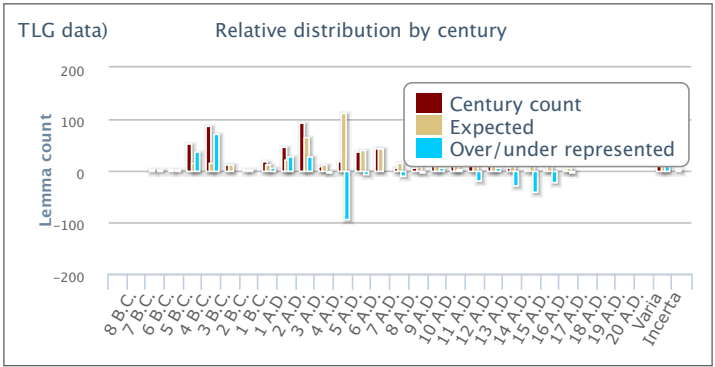
Figure 2.18. TLG: statistics for the lemma Ἀτθίς, -ίδος, ἡ (relative distribution by century)
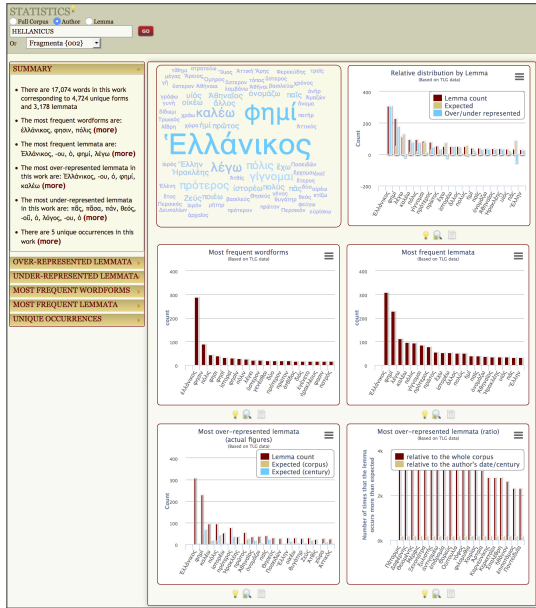
Figure 2.19. TLG: work statistics of Hellanicus' *fragmenta* (`tlg0539.002`)

ments simply duplicates the information contained in other books in a good library. All the texts it brings are usually available elsewhere." In a philological world dominated by printed books, this condition is inevitable in order to collect knowledge and "concentrate information otherwise widely disseminated."[29] In a digital world, where resources are more easily accessible and linkable, the inheritance of printed editorial methods by digital libraries is problematic, because the digital duplication of texts generates distorted results.[30]

Figure 2.20. TLG: N-grams for Ἀττικῶν, δεδήλωκεν, and Ἴστρος

Going back to the examples mentioned above, if we take into consideration F 2 of Hellanicus (FGrHist 323a), we can see how the context of the fragment is repeated several times in the TLG (fig. 2.20). If we activate the TLG n-gram functionality for the string δεδήλωκεν Ἴστρος ἐν γ´ τῶν Ἀττικῶν, we can see that the text is repeated four times in the TLG: as Hellanicus FGrHist 4 F 39 (`tlg0539.002`) and 323a F 2 (`tlg0539.002`), as Ister FHG I fr. 7 (`tlg1450.004`), and as Harpocr. *Lex.* s.v. Παναθήναια (`tlg1389.002`). The text is also repeated under Androtion FHG I fr.

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29   Most (1997) vii.
30   Berti/Romanello et al. (2009).

1 (`tlg1125.003`), but ends before the quoted string.[31] In all these cases, the only citable evidence is the text of the *Lexicon* of Harpocration, which is the surviving text that reuses the lost passages of Hellanicus, Ister, and Androtion and which is therefore repeated multiple times in the editions of these fragmentary authors. If this situation has the advantage of allowing users to visualize the same text in different editions, the problem is that from a computational point of view these repetitions generate wrong results when querying the TLG corpus. They also produce the wrong impression of the existence of fragmentary texts that, as a matter of fact, don't exist any more but are only preserved through quotations and reuses in other texts.

Fragmentary texts come not only from quotations and text reuses, but also from material fragments like papyri, inscriptions, and excerpts in manuscripts. In the example of Hellanicus mentioned above, there are six fragments preserved on papyrus and one testimony from an inscription (fig. 2.13).[32] In this case the texts of the fragments are reproduced following the content and the layout of the FGrHist and of Mette (1978), but there are no links to external resources.[33] Another example is the *Hellenica Oxyrhynchia*, which is a historiographical work preserved only on physical fragments. Also in this case the text is reproduced in the TLG following its reference printed editions (`tlg0558`).[34]

2.1.2 Jacoby Online (JO)

Jacoby Online (JO) is a project specifically aimed at ancient Greek fragmentary historians.[35] It is maintained by the Dutch publisher Brill and is part of a big scholarly enterprise whose goal is to continue and update the editorial work of *Die Fragmente der griechischen Historiker* (FGrHist) began by Felix Jacoby in the Twenties of last century (cf. pp. 35 ff.). The project is also the result of an ongoing effort to make more user-friendly and accessible the volumes of the FGrHist,

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31 The complete text of the lexical entry is published only under the *Lexicon* of Harpocration, while in the other cases the text is partially cut in the same way as it is published in the FHG and in the FGrHist.

32 FGrHist 4 T 30, FF 19b, 68, 124b, 133bis, 189, and 201bis.

33 The text of some of these papyri is available through *Trismegistos* and other digital resources: P.Oxy. VIII 1084 (http://arks.princeton.edu/ark:/88435/sx61dp87h); P.Oxy. X 1241 (www.trismegistos.org/text/63428); P.Oxy. XXVI 2442 (www.trismegistos.org/text/62564); PSI X 1173 (www.trismegistos.org/text/61611). The texts of IG II/III^2 2363 is available through PHI *Greek Inscriptions* (https://inscriptions.packhum.org/text/4599). On these and other digital resources for material fragmentary texts, see section 2.1.4.

34 Bartoletti (1959); FGrHist 66; Mette (1978) 11–12. Absent from the TLG is the text of the *Marmor Parium*: see p. 8.

35 http://referenceworks.brillonline.com/cluster/JacobyOnline

which is a notoriously difficult tool to consult, especially for students of Classics. The first steps of this effort were the publication of complete indices to FGrHist I–III by Pierre Bonnechère and the production of a Windows compatible CD-ROM version of the fifteen volumes of Jacoby's FGrHist I–III and of Bonnechère's indices.[36] The CD-ROM was welcomed as an "excellent tool" and as "a miracle of 20th-century scholarship with a miracle of 21st-century technology."[37] For the first time, users had the possibility to search numerical and alphabetical lists of the 856 FGrHist authors and to be immediately brought with one click to the relevant part of the collection concerning the requested historian.[38] Those who have spent many hours in the library to consult the printed version of the FGrHist — looking for information about authors scattered in the fifteen volumes of the collection — greatly enjoyed the advantages of a single CD-ROM with search and hypertextual functionalities, and the possibility to visualize notes of the critical apparatus in dialogue babbles appearing on lines with textual problems and variants.[39] The CD-ROM version was based on the layout of the printed edition ("page-based") and the aim was to produce, as far as possible, an exact representation of the printed volumes.[40]

The CD-ROM version of the FGrHist is now superseded by the online edition which is part of the *Jacoby Online* project. The current online version is under revision and a new interface is going to be launched as part of a collaboration with the company *Eldarion*, that has also developed the *Scaife Viewer* for the *Perseus Digital Library*: https://scaife.perseus.org. An overview of the new version of the *Jacoby Online* will be described in this section after a description of the current version, which has been used by many scholars in the last ten years.[41]

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36   Bonnechère (1999) and Jacoby (2005). For reviews of the CD-ROM, see Marincola (2005), Worthington (2005), Walter (2005), and Cornell (2006).
37   Marincola (2005) and Cornell (2006) 186.
38   The home page and the booklet accompanying the CD-ROM contained a detailed history of Jacoby and his work written by Mortimer Chambers, which is now available as part of the online version of the *Jacoby Online*: http://dx.doi.org/10.1163/1873-5363_boj_abiografie_jacoby.
39   Cornell (2006).
40   For a detailed description of the CD-ROM, see Marincola (2005), who also points at its limits, such as the price (€ 1,500) and the fact that pieces of information on the margins of the FGrHist pages were not interactive and that the *addenda* and *corrigenda* sections had to be manually searched.
41   I'm very grateful to Ernest Suyver and Mirjam Elbers for giving me access to the demo version of the new *Jacoby Online* and in general for the opportunity to work with them as a contributor and copy editor of the *Jacoby Online* project: see section 2.1.3. This collaboration now also includes the connection between the *Jacoby Online* and the *Digital Fragmenta Historicorum Graecorum* (DFHG) project, that I have been implementing and that is described in chapter 4.

In order to be accessed and consulted, the *Jacoby Online* project requires a subscription and includes five sections:[42]

1. *Die Fragmente der griechischen Historiker* Part I–III. This is the online version of the first three parts of the FGrHist originally published by Felix Jacoby. It gives access to alphabetical and numerical lists of fragmentary authors, to the "commentary on cities and peoples," and to the *addenda*. In the "Prelims," it is possible to consult an introduction to the life and the work of Felix Jacoby, notes for readers (abbreviations, *corrigenda*, and indexes), and prefaces. Texts of fragments are reproduced as they appear in the FGrHist, together with commentaries and notes. Introductions, *testimonia*, *fragmenta*, commentaries, notes, and selected *addenda* to every author are published together in the same web page. A menu on the upper right part of the page contains links to each testimony and fragment. Introductions to authors contain also note numbers, but without links to the actual notes that seem not to have been included in the online collection. Figure 2.21 shows the example of FGrHist 323a F 2 in the *Jacoby Online* that can be compared with the printed page at figure 2.15. References to corresponding FHG and FGrHist fragments have been removed, as well as the notes on the margins of the printed pages. Another difference with the printed edition is the addition of links to the corresponding BNJ fragments (see below). Critical notes to the text of the fragments are reproduced in footnotes at the bottom of the web page and have numbers following the numerical sequence of the notes to the commentary. Those parts of the fragments that Jacoby considered to be direct quotations are reproduced with orange coloured letters and not with spaced-out letters as in the FGrHist. Search and index functions are shared with other parts of the *Jacoby Online*.[43]

2. *Die Fragmente der griechischen Historiker* Part IV. This is the online version of the FGrHist Continued on ancient Greek biography and antiquarian literature that Felix Jacoby was never able to publish. According to the plan, this section will consist of 27 book volumes, some of which have been already published in a printed format.[44] Before the final printed publication, fragmentary authors are progressively published online following the editorial guidelines of the *Jacoby Online* project. This means that, after each introduction to authors with interactive footnotes, there is a "brief encyclopaedia-style entry" with chronological, literary, and geographical metadata. A similar entry is at the beginning of each testimony and each fragment with information on the witnesses, their

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42   As of 2021, the "online subscription price" is € 1,1761 with an "annual update fee" of € 1,285. The "institutional outright purchase price" is € 20,332.

43   http://dx.doi.org/10.1163/1873-5363_bnj_ahelp

44   Bollanséé/Schepens et al. (1998); Radicke (1999); Schepens/Bollanséé (1999); Verhasselt (2018); Brusuelas/Obbink et al. (2019); Zaccaria (2021). The editorial plan is available at http://dx.doi.org/10.1163/1873-5363_jciv_fulltextxml_aaboutiv.

Figure 2.21. *Jacoby Online*: Hellanicus, FGrHist 323a F 2

chronology, language, and literary genre. Every testimony and fragment is accompanied by an English translation and a full commentary (see figure 2.22 to be compared with the printed page at figure 1.12).[45] Critical notes are expressed in footnotes and there are interactive links to fragments of other parts of the FGrHist and the BNJ. Each author section has a bibliography at the end of the web page. Unlike the FGrHist, which was the work of one scholar, FGrHist IV is the result of a team of researchers working on different authors under the direction of Stefan Schorn and an editorial board. Search and index functions are shared with other sections of the *Jacoby Online*.

3. *Die Fragmente der griechischen Historiker* Part V. This is the part of the FGrHist Continued that concerns geography. The plan is to publish testimonies and fragments of 96 Greek historians with the collaboration of a team of scholars under the direction of Hans-Joachim Gehrke and Felix Maier.[46] The online editorial layout is the same of FGrHist IV and search and index functions are shared with other sections of the *Jacoby Online*.

4. *Brill's New Jacoby* (BNJ). The BNJ is described by its editor-in-chief Ian Worthington in the home page of the project: "*Brill's New Jacoby* is a fully-revised and enlarged edition of Jacoby's *Die Fragmente der griechischen Historiker* I–III, providing new texts of the ancient historians in many instances as well as several new historians and many new fragments of existing historians that were either unknown to Jacoby or excluded by him. Especially important is that for the first time ever commentaries are provided on the final 248 historians in FGrHist I–

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45   Given that this is an ongoing project, it is possible to see variants and changes in the
      editorial treatment of authors and fragments.

46   http://dx.doi.org/10.1163/1873-5363_jcv_a

About This Historian

Historian:	Stesimbrotos of Thasos
Jacoby number:	1002
Attested works:	*On Themistokles, Thukydides and Perikles* : T 2, F 1, F 10a
Historian's date:	5th century BC, c. 470-425 BC
Historical focus:	IV. Antiquarian History and Biography ( )	A. Biography	1. Pre-Hellenistic Period
Place of origin:	Thasos
Textual base:	

Testimonia and Fragments

FGrHist 1002 T 1

Source:	Plutarch (Ploutarchos), *Life of Kimon* 4.5
Work mentioned:	
Source date:	1st century AD, c. 46 - 120 AD 2nd century AD
Source origin:	Delphi
Source language:	Greek
Source genre:	Biography--To 500 - Library of Congress History, Ancient - Library of Congress Politics and government - Library of Congress
Fragment subject:	Biography--500 - Library of Congress
Textual base:	

Plutarch (Ploutarchos), *Life of Kimon* 4.5

Στησίμβροτος ὁ Θάσιος ἱστορεῖ, κατὰ τοὺς αὐτοὺς αὐτῷ (sc. Περικλεῖ) χρόνους γενόμενος καὶ ἑωρακὼς αὐτόν, ἐν τῷ ἐπιγραφομένῳ Περὶ Θεμιστοκλέους καὶ Θουκυδίδου καὶ Περικλέους (cf. F 10a).	As recorded by Stesimbrotos of Thasos, a contemporary of his (sc. Perikles) who had seen him, in his book entitled *On Themistokles, Thukydides and Perikles*.

Figure 2.22. *Jacoby Online*: Stesimbrotos of Thasos, FGrHist 1002

BNJ 334 T 1

Source:	Suda, Lexikon, Ἴστρος
Work mentioned:	
Source date:	10th century AD
Source language:	Greek
Fragment subject:	biography-to 500 - Library of Congress criticism - Library of Congress
Textual base:	Jacoby

Suda, *Lexikon,* Ἴστρος

Ἴστρος· Μενάνδρου † Ἴστρου, Κυρηναῖος ἢ Μακεδών, συγγραφεύς, Καλλιμάχου δοῦλος καὶ γνώριμος. Ἕρμιππος δὲ αὐτὸν φησι Πάφιον ἐν τῶι β τῶν Διαπρεψάντων ἐν παιδείαι δούλων. ἔγραψε δὲ πολλὰ καὶ καταλογάδην καὶ ποιητικῶς.	Istros, son of Menander, son of Istros, a Cyrenaeanian or a Macedonian, a prosewriter, a slave and pupil of Kallimachos. Hermippos says in book two of his work about *Slaves Eminent in Learning* that he came from Paphos. He wrote many works both in prose and in verse.

Commentary

The Hermippos mentioned in T 1 is not Istros' colleague at Alexandria, Hermippos of Smyrna. Rather, he is Hermippos of Berytos, a slave by birth who flourished in the time of Trajan and Hadrian as a scholar, writer, and disciple of the historian Herennios Philon of Byblos (S. Fornaro, ' Herennius Philo ' , *BNP* 6 (Leiden, 2005) , 199-201). Hermippos of Berytos' works included *Interpreting Dreams* (five books), On the Number Seven, and *About Slaves Eminent in Learning* (*FHG* 3, 35; *FGrH Continued* 1061 T 1 and T 2). It is the latter work, of course, which includes the reference to our Istros. No doubt, Hermippos of Berytos had a great deal of empathy with Istros of Paphos inasmuch as he considered Istros, like himself, to be both a slave and an eminent scholar.

The two genitives at the beginning of the entry in the *Suda* are problematic, and scholars have tried to understand their meaning. They may refer to the names of the father and grandfather of Istros; alternatively, Ἴστρου is a mistake for ἱστορικὸ or ἱατρὸ with a reference to the job of the father Menander. The two forms may also be variants of the name of the father of Istros (son of Menander or son of Istros) or the result of a fusion of two different entries on Istros son of Menander (Ἴστρος Μενάνδρου) and Istros son of Istros (Ἴστρος Ἴστρου). For these possibilities and bibligrahy see M. Bertì (ed.), *Istro il Callimacheo* 1, *Testimonianze e frammenti su Atene e sull'Attica* (Tivoli 2009), 2-3.

On the relationship between Istros and Kallimachos, on Istros' role as *syngrapheus*, and on the meaning of the adjectives Κυρηναῖος (Cyrenaeanian) and Μακεδών (Macedonian), which may be considered indirect references to the place of origin of his master Kallimachos, see Bertì, *Istro il Callimacheo* 1, 4.

Figure 2.23. *Jacoby Online*: Istros, BNJ 334 T 1

III, which Jacoby was unable to prepare before his death. In addition, and also for the first time, *Brill's New Jacoby* presents facing English translations of all the *testimonia* and fragments, new, critical commentaries on all the testimony and fragments, and a brief encyclopedia-style entry about each historian's life and works, with a select bibliography."[47] Figure 2.23 shows the example of Istros the Callimachean (BNJ 334 T 1). Editors of the BNJ are provided with guidelines and a template to be filled in with metadata and data about fragmentary authors and their works. In order to be consistent, the project offers also lists of subjects for authors, testimonies, and fragments, and special tags are used by copy editors for hyperlinks and anchors of named entities, bibliographic elements, testimonies' and fragments' numbers.[48] Each entry has a final *Biographical essay* on the fragmentary author and a bibliography.[49] The BNJ keeps the numbering system of Jacoby and new authors are inserted in the appropriate section with the same number as the preceding author followed by A or B in order to distinguish them.[50] Following the principle of offering a more user-friendly version of the FGrHist, the BNJ provides not only new commentaries and English translations, but also expanded references to source texts and to bibliographic entries, chronological and literary information, and links and metadata to help readers contextualize fragments and witnesses. Search and index functions are shared with other sections of the *Jacoby Online.*

5. *Brill's New Jacoby*, Second Edition (BNJ2). This part is a "revised and enlarged edition of *Brill's New Jacoby* (BNJ). New additions include an apparatus criticus and a discussion of the provenance of each fragment where relevant, as well as revised commentaries on the ancient historians in BNJ and updated bibliographies, all of which set BNJ2 significantly apart from the previous edition." The online editorial layout is the same of BNJ and search and index functions are shared with other sections of the *Jacoby Online.*

As mentioned before, the current version of the *Jacoby Online* is going to be substitued by a new version in the near future. This new version is presented in a webpage entitled *Documentation for Jacoby Online*, which is maintained by *Brill Scholary Editions* and published with *GitBook*.[51] Given that this documentation is public, my aim is not to repeat it here, but to summarize two main characteristics of the new *Jacoby Online* there were also discussed as part of a seminar

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47 See Worthington (2005) and Lenfant (2009).
48 Lists of subjects grouped under categories are available on the website of the project and can be used to fill in a term in the search category *Subject Keyword* in the Advanced Search: http://dx.doi.org/10.1163/1873-5363_bnj_asubjects.
49 As for FGrHist IV and V, the BNJ is an ongoing project and it is possible to find inconsistencies, errors, and technical problems: see http://dx.doi.org/10.1163/1873-5363_bnj_apreliminaries.
50 Worthington (2005).
51 https://brillpublishers.gitlab.io/documentation-jo/

Table 2.1. New *Jacoby Online*: CITE URNs

Object	URN	Explanation
textgroup	urn:cite:greekLit:fgrh.1	this is the group of fragments
fragment	urn:cite:greekLit:fgrh.1.F1	this is the first fragment (of the type Fragment)
BNJ fragment	urn:cite:greekLit:fgrh.1.F1.jo-grc2	this is the second edition of this fragment
passage	urn:cite:greekLit:fgrh.1.F1@οἱ[1]-γελοῖοι[1]	this URN references the phrase οἱ γὰρ Ἑλλήνων λόγοι πολλοί τε καὶ γελοῖοι in the fragment
translation of BNJ fragment	urn:cite:greekLit:fgrh.1.F1.jo-eng2	BNJ2 would be jo-eng3
commentary on BNJ fragment	urn:cite:greekLit:fgrh.1.F1.jo-eng5	BNJ2 would be jo-eng3. Hekataios belongs to the German commentaries, as it sits in FGrHist I
commentary on textgroup	urn:cite:greekLit:fgrh.1.jo-eng5	This is the commentary in BNJ. As it happens, Jacoby himself wrote no commentary on the entire textgroup, only on its fragments. Unfortunately, the number 5 is confusing, as this is not the fifth commentary. But is done for the sake of consistency. The number always denotes BNJ.
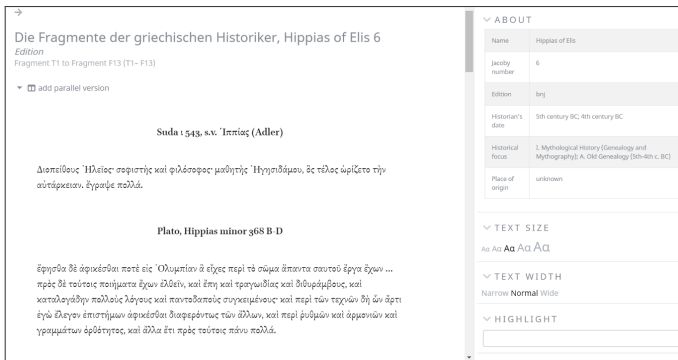
Figure 2.24. New *Jacoby Online* demo (early 2020)

organized at Brill in Leiden on January 22, 2020 with the participation of Stefan Schorn, James Tauber, Ian Worthington, Cecily Robinson, Mirjam Elbers, Ernest Suyver and myself. The first important characteristic in order to combine the needs of the contributors and the needs of the *Jacoby Online* is the substitution of Brill XML files, that were used in the past, with BPT files as a basic format to produce TEI XML files for the publication on *Brill Scholarly Editions* (fig. 2.24).[52] New extended Guidelines for authors have been written about entry structure, publication statement, the historian, *testimonia*, fragments, biographical essay and bibliography.

The second important aspect of the new *Jacoby Online* is the adoption of the *CITE Architecture* to produce uniform and stable identifiers of the following seven JO objects:[53] 1) `textgroup`: a group of fragments, united by origin, theme, and/or (most common) authorship; 2) `fragment`: a textual remnant of an otherwise lost work ("`Fragment` is a child of textgroup. We could have a collection level = fgrh"); 3) `historian`: author of an (in the case of JO) lost historiographical work ("`Historian` is metadata about (a version of) a textgroup"); 4) `work`: (in the case of JO) lost historiographical work ("`Work` is metadata about (a version of) a fragment"); 5) `source`: text (itself a work) containing a citation of or reference to a lost work or its author; 6) `entry`: a textgroup as analyzed by modern scholars ("`Entry` is metadata about (a version of) a textgroup"); 7) `edition`: edition of the source texts ("`Edition` is metadata about (a version of) a source"). *Jacoby Online* adopts both CITE and CTS URNs to cite texts, papyri, inscriptions and fragments. The

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52 BPT stands for *Brill Plain Text* and the language of these files is Markdown with some Brill-specific extensions. BPT supports the inclusion of additional mark-up, such as Leiden+ for epigraphical texts (http://papyri.info/docs/leiden_plus), YAML for metadata and references, and HTML. Figure 2.24 shows an example of the demo of the new *Jacoby Online* with fragments of Hippias of Elis and the *widget* for the metadata about the historian.

53 On the *CITE Architecture*, see section 3.2.

syntax of each URN includes `fgrh` as the textgroup identifier and `jo` as the version identifier. Table 2.1 shows examples for Hekataios of Miletos (FGrHist 1).

Brill's New Jacoby	🔒

Istros (334)

(44,586 words)

This entry was prepared by Steve Jackson and Monica Berti and published on 1 October 2015.

Article Table Of Contents

About this Historian

T 1 : Suda, Lexikon, Ἴστρος

T 2 : Athenaios, Deipnosophists, 6, 103, 272b

Historian:	Istros
Jacoby number:	334
Attested works:	
Historian's date:	3rd century BC
Historical focus:	III. History of Cities and Peoples (Horography and Ethnography)	B. Authors on Single Cities and Regions	XI. Athens
Place of origin:	unknown

T 3 : Plutarch (Ploutarchos), Greek Questions, 43, 301d

T 4 : Scholia, 1694

T 5 : Plutarch (Ploutarchos), On the Pythian Oracle, 19, 403e

T 6 : Athenaios, Deipnosophists, 9, 38, 387f

F 1 : Photios, Lexikon (ed. Naber, Reitzenstein), - Τιτανίδα γῆν N.

BNJ 334 T 1

F 2a : Harpokration Harpokration, Lexicon on Ten Attic Orators, Λαμπάς

Source:	*Suda*, ι 706, s.v. Ἴστρος (A. Adler (ed.), *Suidae Lexicon* (Leipzig 1928-38))
Work mentioned:	
Source date:	10th century AD
Source language:	Greek
Fragment subject:	biography-to 500 - Library of Congress criticism - Library of Congress

F 2b : Harpokration Harpokration, Lexicon on Ten Attic Orators, Λαμπάδος (ex epitoma)

F 3 : Harpokration Harpokration, Lexicon on Ten Attic Orators, Θεοίνιον

Figure 2.25. Istros, BNJ 334

2.1.3 Printed and Digital Fragments: Istros the Callimachean

The edition of the fragments of Istros the Callimachean is an example of a work shifting from printed to digital characteristics. I originally conceived this work in the form of a printed book as part of the Italian series *I Frammenti degli Storici Greci*. The first volume containing the fragments on Athens and Attica was published in 2009 and its characteristics have been described in section 1.4.[54] I published a second edition with the *testimonia* and all the seventy-seven fragments of Istros the Callimachean in 2015 for the *Brill's New Jacoby*, as the result of an invitation by Ian Worthington to complete the work originally begun by the late Steve Jackson (fig. 2.25).[55] This edition presents fragments according to the traditional model of printed editions, but with the addition of metadata and hyperlinks that will be further expanded in the revision of the fragments for the second edition of BNJ and as part of the new version of the *Jacoby Online*.

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54   Berti (2009b); Berti (2009a); Berti (2013b).
55   BNJ 334: http://dx.doi.org/10.1163/1873-5363_bnj_a334.

FHG_author = "Ister"						
FHG	Volume: FHG 1	Author: Ister	Pages: 418-427	Paper Edition	DFHG	urn:cite:lofts:fhg.1.ister
FGrHist		Author: Istros der Kallimacheer	Number: 334		Jacoby OnLine	
BNJ 1		Author: Istros	Number: 334		Jacoby OnLine	
Perseus Catalog		Author: Ister Cyrenaeus			Perseus Catalog Entry	
FHG	Volume: FHG 1	Author: Ister	Pages: 418-427	Paper Edition	DFHG	urn:cite:lofts:fhg.1.ister
FGrHist		Author: Istros	Number: 1768		Jacoby OnLine	
Perseus Catalog		Author: Ister Cyrenaeus			Perseus Catalog Entry	

Figure 2.26. DFHG: Ister (concordance of editions)

As it will be extensively described in chapters 4 and 5, one of the goals of new born-digital editions of fragmentary texts is to expand and connect resources. As far as Istros is concerned, the first step was accomplished by producing the digital version of its fragments published by Karl Müller in the *Fragmenta Historicorum Graecorum*, which is fundamental to understand the edition of Felix Jacoby in *Die Fragmente der griechischen Historiker*. Figure 2.26 shows the concordance among the entries of Istros in different resources as part of the *Müller-Jacoby Table of Concordance* of the *Digital Fragmenta Historicorum Graecorum* project (see section 4.4.3). Future work will conceive the edition of the fragments of Istros the Callimachean not as the extraction of chunks of text (*fragmenta*), but as the annotation of pieces of information concerning him and his works in the context of surviving sources.[56] The lack of digital versions of all the sources that preserve testimonies and text reuses of Istros is still a limit for the accomplishment of this task, but preliminary results are now available through the *Digital Athenaeus* project (see chapter 5).

Figure 2.27 shows the lemma Ἴστρος and its inflected forms in the *Named Entities Concordance* of the *Deipnosophists*.[57] The concordance highlights the name of Istros (red) (and the homonymous river) and other named entities (blue-green) pertaining to him, such as other authors, *ethnica*, and work titles that are cited in the immediate context. The extraction and annotation of Named Entities pertaining to text reuses of lost authors is the beginning of a new philological practice that will enable scholars to produce new digital and dynamic editions of fragmentary authors and works within their context of transmission.

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56   For the description of this model, see section 3.1 and Berti (2019c).
57   For a detailed description of this resource, see section 5.6.2.

Digital Athenaeus

G. Kaibel: Athenaei Naucratitae Dipnosophistarum libri 15

Named Entities Concordance

Ἴστρος [Istros] (lemma) ▾   Submit

Lemma: **Ἴστρος [Istros]**
lemma in LOGEION

Inflected form: **Ἴστρον [Istron]** - search in Kaibel 🔍
inflected form in TLG
Named Entity Class: LOC

6.25 [αὐτοὺς διώκισεν ἐπὶ τοὺς περὶ τὸν Ἴστρον τόπους .... ἀφ' ἧς καὶ τὴν]
7.88 [σκευαζόμενος, παραπλήσιος ὢν τῷ κατὰ τὸν Ἴστρον γινομένῳ γλάνιδι. φέρει δ' ὁ Νεῖλος]

Named Entity Class: PER

9.38 [οἰκήσοντα ἀποπέμψω, ὡς Πολέμων ὁ περιηγητὴς Ἴστρον τὸν Καλλιμάχειον συγγραφέα εἰς τὸν ὁμώνυμον]

Inflected form: **Ἴστρος [Istros]** - search in Kaibel 🔍
inflected form in TLG
Named Entity Class: PER

3.6 [μέν, νὴ τὸν Δία, πάνυ φέρει. Ἴστρος δ' ἐν τοῖς Ἀττικοῖς οὐδ' ἐξάγεσθαι]

Named Entity Class: LOC

3.88 [οὕτως· ἐδέξατ' ἀντακαῖον, ὃν τρέφει μέγας Ἴστρος Σκύθαισιν ἡμίνηρον ἡδονήν. καὶ τὸν Μενδήσιον]

Named Entity Class: PER

6.103 [ὁ Ἐπιτίμαιος (οὕτως δ' αὐτὸν καλεῖ Ἴστρος ὁ Καλλιμάχειος ἐν ταῖς πρὸς αὐτὸν]
8.35 [μίαν ἡμέραν μὴ δεδύνησαι ἐνεγκεῖν ὀψοφαγίαν; Ἴστρος δέ φησι Χοιρίλον τὸν ποιητὴν παρ']
11.55 [ἐπ' ἀλλοδαπὴν οἶμον ἔβαινε πόδα. ΚΟΝΩΝΕΙΟΣ. Ἴστρος ὁ Καλλιμάχειος ἐν πρώτῳ Πτολεμαΐδος τῆς]
13.4 [Ἑλένην ἁρπάσας ἑξῆς καὶ Ἀριάδνην ἥρπασεν. Ἴστρος γοῦν ἐν τῇ τεσσαρεσκαιδεκάτῃ τῶν Ἀττικῶν]
14.63 [ἐπιδαψιλεύειν ἐν αὐτῇ τὸ φυτόν, φησὶν Ἴστρος ἐν τοῖς Ἀργολικοῖς ὅτι δὲ τὰς]

Figure 2.27. *Digital Athenaeus*: NEs concordance (Istros)

2.1.4 Digital Collections of Physical Fragmentary Texts

The expression *fragmentary texts* refers not only to quotations and text reuses, but also to physical fragments that bear textual evidence, which includes many examples of literary texts. As we have seen before, the TLG and the *Jacoby Online* collect also texts of ancient Greek authors preserved on material fragments. Scholars interested in getting more information about this type of sources have now at their disposal many digital projects and resources devoted to collecting data about physical fragments (inscriptions, papyri, manuscripts, etc.). A complete description of these resources is beyond the scope of this volume, but, in order to be up to date with them, I refer to the *Digital Classicist Wiki*, which is a hub for collecting guidelines, suggestions, and catalogs of digital projects concerning the Graeco-Roman world.[58] In this section, I limit my presentation to the most important digital reference tools that can be used in a scholarly work about ancient Greek fragmentary authors and works.

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58 See https://wiki.digitalclassicist.org and also Babeu (2011). On papyrological resources, see Reggiani (2017) and Reggiani (2018). On epigraphical resources, see now http://epigraphy.info/ and De Santis/Rossi (2019).

The PHI *Greek Inscriptions* is an electronic database produced by the *Packard Humanities Institute*.[59] It offers a comprehensive collection of searchable Greek inscriptions arranged by ancient regions and modern scholarly collections. The reconstructed text of the inscriptions is reproduced according to the main *corpora* and reference printed editions, but without the critical apparatus and the commentaries. This resource allows users to find the text of inscriptions that have been classified also as *testimonia* or *fragmenta* of fragmentary authors. Examples are IG II/III² 2363, IG XII 5, 444, and IG XIV 1293. IG II/III² 2363 is a 2nd-1st century BC inscription from Piraeus with a catalog of mostly Attic writers including Hellanicus (col. 2, 4 = FGrHist (BNJ) 4 T 30).[60] IG XII 5, 444 is a 3rd century BC inscription with the text of the *Marmor Parium*, which is a historiographical fragmentary work attested only on stone (= Jacoby (1904) and FGrHist (BNJ) 239).[61] IG XIV 1293 is a marble plaque (*Tabula Albana)* with inscriptions of uncertain provenance and date that preserve an anonymous history of Heracles (FGrHist (BNJ) 40 F 1).[62] The complete texts of these inscriptions are available through the PHI *Greek Inscriptions* website (fig. 2.28).[63] The resource provides links to other publications within the PHI database, but not to external resources. Each inscription has a unique reference number, which is also embedded in a stable URL.

Regions : Sicily, Italy, and the West (IG XIV) : Italy, incl. Magna Graecia

IG XIV 1293   ← IG XIV 1292   IG XIV 1294 →

[ ] Italia (Roma et vicinia) — Prov. unkn. [Roma, Villa Albani] — 2nd c. AD (Sadurska) — cf. p. 698, Add. et Corr. — cf. IGUR IV 1612-1633 (1630)
     See also: SEG 50:1066.

     I   {²nomina figuris ascripta in superiore parte tabulae:}²
     I   [— —]#⁷[— —]
     2.1   Εὐρώπη
     3.1   Ἰταλός
     4.1   Ἡρακ⟨λ⟩ῆς
            ἀναπαόμε-
            νος
     5.1   ΒΑ#⁷[— — —]
            ΤΟΠ.[— —]
     A.col. I.1   Ἡρακλέους.
            Ἡρακλέους πράξεις.
            Ἡρακλῆς ἐν νέᾳ γενόμενος
            [Μινυᾶν] Ὀρχομενὸν εἷλε τὰν
     5   πόλιν Ἐργῖνον φονεύσας τὸν
            βασιλέα καὶ τὰν [λίμ]ναν ἐπὶ

Figure 2.28. PHI *Greek Inscriptions*: IG XIV 1293

Trismegistos (TM) is an interdisciplinary portal of papyrological and epigraphical resources formerly focused on Egypt and the Nile valley (800 BC–800 CE)

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59 See Iversen (2007) and, for a review of the online project, Gawlinski (2017). On other projects of the *Packard Humanities Institute* for Classical sources, see p. 43.
60 Blum (1991) 186 and 191.
61 See section 4.5 (*Digital Marmor Parium* project).
62 Sadurska (1964) 83–85.
63 See https://inscriptions.packhum.org/text/4599, https://epigraphy.packhum.org/text/77668, and https://inscriptions.packhum.org/text/141279.

Figure 2.29. *Trismegistos Authors*: Hellanicus of Lesbos

and now expanding to the Ancient World in general.[64] *Trismegistos* offers many resources and gives the possibility to obtain metadata concerning also physical fragments that have been attributed to fragmentary authors and works. An interesting service is the *Authors* database for searching ancient author names and work titles. The aim of the resource is to collect information about all authors who wrote between 800 BC and 800 CE including also "authors attested only as fragments in other works." As for now, the resource is based on the *Leuven Database of Ancient Books* (LDAB) and *Trismegistos* editors warn users about limits, errors, and possible lack of data.

Going back to the examples mentioned in the previous pages, *Trismegistos* has an entry about Hellanicus of Lesbos with a stable URI: https://www.trismegistos.org/author/358. The resource provides metadata (chronology, onomastics, ethnic, genre, language and bibliography) and links to different types of external resources such as *Wikipedia*, the manuscript collection of *Pinakes*, the *Perseus Catalog*, the TLG *Canon*, and *Jacoby Online* (fig. 2.29). As far as Hellanicus' works are concerned, *Trismegistos* collects three papyri differentiating them between direct attestations and quotations (fig. 2.30): P.Oxy. VIII 1084 (*Atlantis*), P.Oxy. XXVI

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64 For a detailed history and description of the project, see Reggiani (2017) 56–73, and Depauw (2018). *Trismegistos* was an open resource that, starting from January 1, 2020, requires a subscription to access all search interfaces and visualisations due to shortcuts in funding: 1) unlimited access through a subscribed institution (€ 990,91 excl. VAT per year), 2) institutional access for one concurrent user through a login (€ 299 per year excl. VAT), and 3) personal single user access through a login (€ 199 per year incl. VAT).
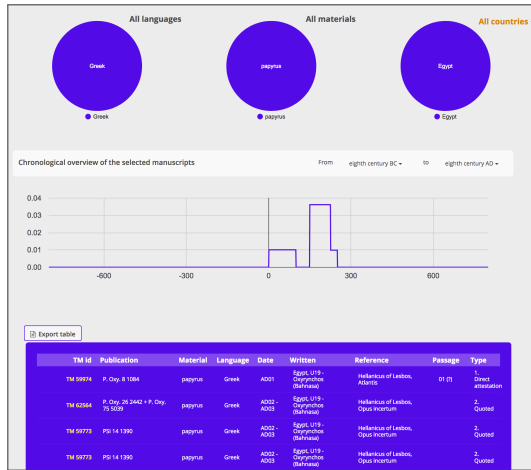
Figure 2.30. *Trismegistos Authors*: Hellanicus of Lesbos (works)

Figure 2.31. *Trismegistos*: P.Oxy. VIII 1084

2442 + P.Oxy. LXXV 5039 (*opus incertum*), and PSI XIV 1390 (*opus incertum*).[65]
P.Oxy. VIII 1084 is a papyrus dated between the 1st and the 2nd century CE,
whose text has been attributed to the *Atlantis* of Hellanicus of Lesbos (FGrHist
(BNJ) 4 F 19b). *Trismegistos* offers a detailed description of the papyrus including
the attribution to Hellanicus (*direct attestation*), a reference to the FGrHist, and a
link to *Papyri.info* for other metadata and pictures (fig. 2.31).[66] P.Oxy. XXVI 2442
is constituted by several fragments of papyrus dated to the 2nd and 3rd centuries
CE with fragments and *scholia* to Pindar that mention the name of Hellanicus
(fr. 29, 1–8 = Mette (1978) 7, fr. 133bis = BNJ 4 F 101a). P.Oxy. LXXV 5039 is
associated to the previous papyrus because it belongs to the same set of rolls, but
doesn't contain the name of Hellanicus. *Trismegistos* has a page with metadata
about both papyri and includes the reference to Hellanicus specifying that this is
a reference to his name (*quoted*) and not one of his fragments (*direct attestation*),
but in the bibliography doesn't refer to the BNJ.[67] PSI XIV 1390 is constituted by
three fragments dated to the 2nd century CE and contains a *scholion* to Euphorion
that mentions the name of Hellanicus (FGrHist 4 F 197bis = BNJ 4 F 197a). *Trismegistos* has a page on the papyrus with metadata, a reference to the fact that
Hellanicus is quoted in the text but this is not one of his direct attestations, and
a link to the database of the *Papiri della Società Italiana* with further information
and pictures.[68]

The TM *Authors* database allows also to search work titles. An example
is the *Hellenica Oxyrhynchia*. In this case *Trismegistos* collects — as *direct attestations* under the heading *Anonymus of the Hellenica Oxyrhynchia, Hellenica
Oxyrhynchia* — the fragments from the collections of Oxyrhynchos, Florence, and

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65   It is not clear why PSI XIV 1390 is repeated twice, but Trismegistos editors warn about
    possible duplicates still present in the database. *Trismegistos* text types are related to the
    Leuven Database of Ancient Books (LDAB) metadata. As of now, there are four text types
    in *Trismegistos*: 1) *Direct attestation* (13,445 of the 15,101 attestations of authors in texts):
    this means that the text preserves the work of author X; 2) *Quoted* (882 attestations): this
    means that in the text a work of author X is quoted or referred to; 4) *Commented upon*
    (352 attestations): this means that a work of author X is the subject of a commentary;
    5) *Epitomised* (422 attestations): this means that a work of author X is summarised. In
    the past there was also 3) *Translated*, but now there is a separate entry in works for each
    translation. I'm very grateful to Mark Depauw for this information about the current state
    of text types in *Trismegistos*.
66   See https://www.trismegistos.org/text/59974 and http://papyri.info/apis/princeton.apis.p2
    1. *Papyri.info* aggregates material and metadata from the *Advanced Papyrological Information System* (APIS), *The Duke Databank of Documentary Papyri* (DDbDP), the *Heidelberger
    Gesamtverzeichnis der griechischen Papyrusurkunden Ägyptens* (HGV), the *Bibliographie Papyrologique* (BP), *Trismegistos*, and also *The Arabic Papyrological Database* (APD). On the
    development of the project as part of *Integrating Digital Papyrology* and on its search and
    editing functionalities, see Reggiani (2017) 222 ff.
67   https://www.trismegistos.org/text/62564
68   https://www.trismegistos.org/text/59773

Cairo.[69] Given that *Trismegistos* collects data from other resources and the *Authors* database is a work in progress, there are papyri associated with the name of Hellanicus that are still missing or that are not yet imported in the author section, and data from *Jacoby Online* seems not to have been completely ingested.[70] In spite of that, *Trismegistos* is producing a fundamental resource for connecting and aggregating databases and metadata about the ancient world through stable identifiers and following recommendations and best practices of the *Linked Open Data* (LOD) initiative.[71] Considering the huge amount of data to be collected and inserted into a complex database structure, the project is a model for establishing a collaborative environment and an integrated network of scholars on the ancient world.[72] As far as fragmentary texts are concerned, this resource is very promising not only for publishing comprehensive digital data about physical fragments of literary texts, but also for aggregating catalog data about fragmentary authors and works (cf. sections 4.4.1 and 4.4.2).

I.Sicily (*Inscriptiones Siciliae*) is a project directed by Jonathan Prag at the University of Oxford for making freely available online the complete corpus of inscriptions from ancient Sicily in all languages from the 7th century BC through late antiquity.[73] Inscriptions are encoded in XML according to the TEI EpiDoc schema and are stored in a database that can be filtered and searched in many different ways.[74] Each document has a unique identifier, as for example `ISic000298`.[75] Identifiers are cross-referenced with other collections like *Trismegistos* (TM), PHI *Greek Inscriptions*, and the *Epigraphic Database Roma* (EDR).

The goal of the project is to provide a new edition of every inscription with images, a commentary, and an up to date bibliography maintained in a separate public Zotero group library: https://www.zotero.org/groups/382445. An example for our interests in ancient Greek fragmentary historiography is represented

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69 https://www.trismegistos.org/authorwork/2177

70 An example is P.Oxy. X 1241 that is part of *Trismegistos* and bibliographical metadata includes a reference to FGrHist 4 F 189, but the papyrus is not yet part of the *Authors* database: https://www.trismegistos.org/text/63428. Another resource connected to *Trismegistos* is the *Digital Corpus of Literary Papyri* (DCLP), which is building on tools and data of the *Integrating Digital Papyrology* project and *Papyri.info* to establish a database of literary papyri: http://www.litpap.info. *Trismegistos* numbers allow to obtain information concerning literary papyrological resources about fragmentary historians. For example, through TM 59974, it is possible to browse the DCLP and visualize the page on P.Oxy. VIII 1084, which is the papyrus with a fragment of the *Atlantis* of Hellanicus (see above in the text): http://litpap.info/dclp/59974.

71 Depauw/Gheldof (2014); Gheldof (2016); Reggiani (2017) 56 ff.; Depauw (2018). On LOD for data about the ancient world, see Elliott/Heath et al. (2014) and Cayless (2019).

72 Reggiani (2017) 56 ff.

73 Prag/Chartrand (2018).

74 Filters in the *I.Sicily* database include *id*, *date*, *place*, *material*, *object*, *inscription type*, *execution type*, *language*, *museum*, *status*, *other identifiers* (*Trismegistos*, EDR, and PHI).

75 http://sicily.classics.ox.ac.uk/inscription/ISic000298

by five painted fragments dated between the 3rd and the 2nd century BC from Tauromenium, which preserve traces of entries possibly belonging to a library catalogue. The text contains bio-bibliographic information about ancient authors who wrote in Greek: the fragmentary historians Callisthenes of Olynthus (BNJ 124), Philistos of Syracuse (BNJ 556), and Quintus Fabius Pictor (BNJ 809), an author from Elea whose name is lost and the fragmentary philosopher Anaximander.[76] The edition of the fragments in *I.Sicily* is still incomplete without images, a physical and epigraphic description, a critical apparatus and a commentary, but already includes bibliographic records, the current geo-location, and the date of the autopsy of the document.[77] The Greek text is based on the edition provided by PHI and is published in three versions: *interpreted*, *diplomatic*, and downloadable TEI EpiDoc XML. The text has a corresponding identifier in *Trismegistos* (TM 494031), whose entry includes bibliographic records but still misses further metadata about the fragments and their linguistic content.[78]
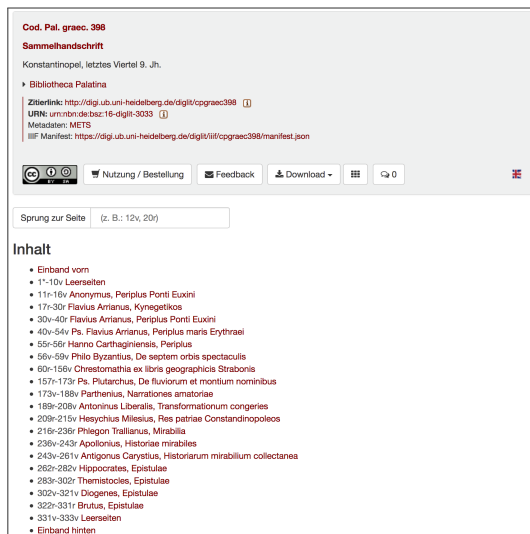
Figure 2.32. *Bibliotheca Palatina digital*: *Codex Palatinus Graecus* 398

The last resource is *Pinakes* (*Textes et manuscrits grecs*), which is a French database for collecting catalog data about manuscripts of ancient Greek texts up to the end of the 16th century (excluding papyri). When the project was launched in 2008, the online collection counted 200,000 records concerning the manuscript tradi-

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76   For recent and new readings of the fragments, see Battistoni (2006) and Matijašić (2018) 80–81.

77   http://sicily.classics.ox.ac.uk/inscription/ISic000613

78   https://www.trismegistos.org/text/494031

tion of 13,000 works from 40,000 manuscripts preserved in 1,300 libraries. The re-source is a very good starting point for obtaining information about manuscripts and about authors and works preserved by them.

An example is *Codex Palatinus Graecus* 398, which is a manuscript of the 9th century from Constaninople that is part of the *Bibliotheca Palatina* of Hei-delberg. The manuscript collects texts of sixteen authors including Phlegon of Tralles and Hesychius of Miletus, who are part of the *Fragmenta Historicorum Graecorum* and *Die Fragmente der griechischen Historiker*.[79] *Pinakes* has an en-try about the manuscript with a detailed description and bibliography, and with the list of authors and texts preserved by it which are part of a general *Pinakes* catalog of ancient authors and works transmitted through manuscript tradition: http://pinakes.irht.cnrs.fr/notices/cote/32479. *Pinakes* offers also a link to the page of the *Bibliotheca Palatina digital* project with a complete description of the manuscript, high resolution images of each page, and a stable identifier expressed as a URN (`urn:nbn:de:bsz:16-diglit-3033`) (fig. 2.32).[80]

2.2 Textual Fragments as Hypertexts

Editions of fragmentary texts are collections of excerpts from many different sources and are therefore representations of hypertexts.[81] Figure 2.33 shows a lost text of Istros the Callimachean quoted by Athenaeus of Naucratis that has been extracted from the context of the *Deipnosophists* (on the right) and repro-duced in a printed collection of fragments of Istros (on the left).[82]

As discussed in the previous sections, this is a characteristic of the print culture that has been inherited by the first generation of digital libraries, which have been digitizing both source texts and collections of textual fragments derived from them (p. 55).

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79   FHG III 602–624 = FGrHist (BNJ) 257; FHG IV 143–177 = FGrHist (BNJ) 390.
80   The permalink is http://digi.ub.uni-heidelberg.de/diglit/cpgraec398. The link includes other links for visualizing the pages of the manuscript with the works of authors preserved on it. An example is the *Mirabilia* of Phlegon of Tralles: http://digi.ub.uni-heidelberg.de/di glit/cpgraec398/0435. *Bibliotheca Palatina digital* includes also a *Creative Commons* licence (BY–SA 3.0 DE), an XML METS file with metadata of the manuscript, and a IIIF Manifest JSON id.
81   On the definition of hypertext in computing and literary studies, see Landow (2006). On the impact of hypertext in Classical scholarship, see Crane (1987).
82   Berti (2009b) 99.

In this case, the model of the printed edition generates a static hypertext that in a digital enviroment can be converted into a hyperlink from the fragment to the passage of the *Deipnosophists* in order to help readers contextualize the reuse of the lost text of Istros.[83]
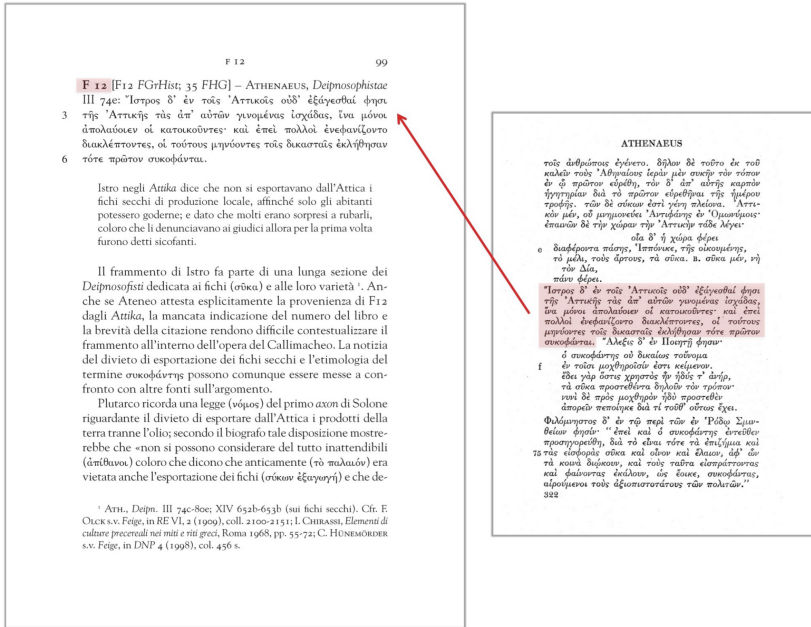
Figure 2.33. Excerpting fragments: Istros F 12 Berti = *Deipn.* 3.74e

Printed collections of fragmentary texts contain many other hypertextual elements, as visible in figure 2.34.[84] The number of the fragment (F 1) corresponds to numbers of fragments in other collections (F 1 FGrHist; 1–2 FHG), where the same and other source passages have been excerpted, edited, commented and

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83 On the relationship between context and text reuse, see section 2.3. Cf. also Landow (2006) 55: "Hypertext, which is a fundamentally intertextual system, has the capacity to emphasize intertextuality in a way that pagebound text in books cannot."

84 Berti (2009b) 43.

classified to reconstruct the lost text of Istros.[85] These correspondences are static hyperlinks to other editions that have to be consulted for analyzing different interpretations of text reuses of the same lost text.

> **F 1** [F1 *FGrHist*; 1-2 *FHG*] – Photius [T 591] s.v. Τιτανίδα
> γῆν· οἱ μὲν τὴν πᾶσαν· οἱ δὲ τὴν Ἀττικήν· ἀπὸ Τιτηνίου ἑνὸς
> 3   τῶν Τιτάνων ἀρχαιοτέρου οἰκήσαντος περὶ Μαραθῶνα· ὃς μόνος
> οὐκ ἐστράτευσεν ἐπὶ τοὺς θεούς, ὡς Φιλόχορος ἐν Τετραπόλει.
> Ἴστρος δ᾿ ἐν α᾿ Ἀττικῶν * * Τιτᾶνας βοᾶν· ἐβοήθουν γὰρ
> 6   τοῖς ἀνθρώποις ἐπακούοντες, ὡς Νίκανδρος ἐν α᾿ Αἰτωλικῶν·
> ἐνομίζοντο δὲ τῶν Πριαπωδῶν θεῶν εἶναι.
>
> Cfr. *Suda* [T 677] s.v. Τιτανίδα γῆν ([T 686] s.v. Τιτηνίδα γῆν) et Apostol.
> XVI 69 (s.v. Τιτανίδα παροικεῖς)   4 Φιλόχορος ἐν Τετραπόλει : *FGrHist*
> 328 F74   6 Νίκανδρος ἐν α᾿ Αἰτωλικῶν : *FGrHist* 271-272 F4
>
> 1 Τιτανίδα : Τιτηνίδα *Suda* (A^{ac}FV^{bc}, cfr. [T 686])   1-2 Τιτανίδα ~ πᾶσαν :
> Τιτανίδα παροικεῖς· ἐπὶ τῶν φιλοθέων Apostol.   2 πᾶσαν : πᾶσαν γῆν Apostol.
> Ἀττικὴν : Ἀττικὴν φασίν Apostol. . Τιτηνίου *Suda*, Apostol. : Τιτηνίου Phot.,
> Τιτάνου (Τιτανίου V) *Et. M.* s.v. Τιτανίδα γῆν, τῶν κατασχόντων Hesych.
> [T 974] s.v. Τιτανὶς γῆ, Τιτάκου Wilamowitz   3 ἀρχαιοτέρου : τὸ ἀρχαῖον
> vel ἀρχαιότερον vel [ἀρχ.] «ut huic irrepserit Τιτάνων ἀρχαιότεροι articulo
> explicatione carens ex Aristoph. *Av.* 469» Dobree   περὶ : παρὰ *Suda* (FV)
> Μαραθῶνα : Μαραθῶρα *Suda* (A)   3-7 ὃς ~ εἶναι om. *Suda* (F)   5 Ἴστρος δ᾿
> ἐν : καὶ Ἴστρος ἐν Apostol.   α᾿ : πρώτη Apostol.   * * Jacoby   βοᾶν : βοᾶν
> *Suda*   5-7 Τιτᾶνας ~ εἶναι om. Apostol.

Figure 2.34. Istros F 1 Berti

In this example the *Lexicon* of Photius is the source text that quotes Istros the Callimachean (Photius [T 591] s.v. Τιτανίδα γῆν). This is a pure hypertext because the entry of the lexicographer, that has been extracted and reproduced in the collection of the fragments of Istros, points to the entire lexicon of Photius and its different editions. In figure 2.34, after the Greek text of the fragment, there is a section that collects *loci paralleli*, which are other sources that preserve a similar text reuse or discuss the same topic, and references to other lost authors who are mentioned by Photius in the same context where appears the quotation of Istros.[86] All these parallel sources and editions are hypertextual elements de-

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85   FGrHist 334 F 1 and Istros F 1 Berti publish the entry of Photius' *Lexicon* ([T 591] s.v. Τιτανίδα γῆν) as the main source of the fragment of Istros (in Berti the entry is complete, while Jacoby prints only the first part of it). Müller in FHG I 418, fr. 1 publishes the same entry of the *Suda* (s.v. Τιτανίδα γῆν) as the source text of the lost fragment of Istros and cites Photius' entry (s.v. Τιτανίδα γῆν) in the commentary to the fragment. Müller also publishes a passage of the *Collectio paroemiarum* of Apostolius (XVIII 77) as the source text of fragment 2 of the *Attika* of Istros, while Jacoby and Berti cite Apostolius (XVI 69) as a *locus parallelus* of fragment 1. The two different citations of Apostolius depend on the use of different editions (Jacoby and Berti used the edition by Ernst Ludwig von Leutsch, while Müller used the edition by Daniel Heinsius).

86   *Suda* [T 677] s.v. Τιτανίδα γῆν (cf. [T 686] s.v. Τιτηνίδα γῆν); Apostol. XVI 69 (s.v. Τιτανίδα παροικεῖς); Philoch., FGrHist (BNJ) 328 F 74; Nicander, FGrHist (BNJ) 271–272 F 4. The TLG is adding some of these hyperlinks in its collection. For example, in the TLG entry of Photius (tlg4040) there is a link to the fragment of Philochorus as published in the FGrHist.

rived from the analysis of the fragment of Istros. The last section of figure 2.34 is the *apparatus criticus*, that contains a critical summary of the historical tradition of the lexical entry of Photius and that generates another group of possible hyperlinks to sources, manuscripts, and philological conjectures.[87] Beyond these elements that pertain to a single fragment, a printed edition of fragmentary texts includes other hypertexts and potential hyperlinks in the commentaries, in the footnotes, and in other sections at the end of the volume. Figure 2.35 is a screenshot from the project *demo.fragmentarytexts.org* that summarizes these elements and describes them in separate web pages: 1) editing and commenting text reuse, 2) concordance tables, 3a) indexes of sources, 3b) indexes of names, and 4) bibliography.[88]
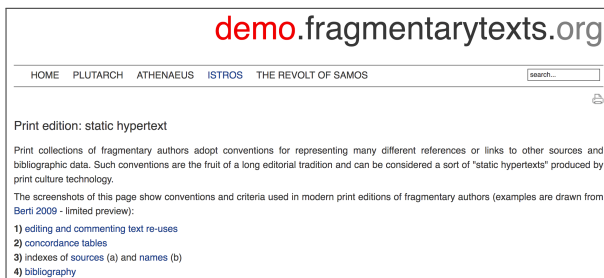
Figure 2.35. Istros: print edition (static hypertext)

According to the definitions presented in chapter 1 and if I exclude physical fragments of ancient texts, textual fragments can be described as quotations and reuses of other texts that generate a complex multisequential and non-linear network of hypertexts. As we have seen before, the first natural hypertext is between the extracted fragment (e.g., Istros F 12 Berti) and its source text (Athen., *Deipn.* 3.6 = 74e). Other kinds of hypertexts are produced by parallel sources (*loci paralleli*). I have mentioned the example of Istros F 1 Berti and I can also analyze Istros F 4 Berti.[89] In this case the main source who quotes Istros the Callimachean is

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87 For example: hyperlinks to the texts of the *Etymologicum Magnum* (s.v. Τιτανίδα γῆν) and of the *Lexicon* of Hesychius ([T 974] s.v. Τιτανὶς γῆ), to different readings in different manuscripts of the *Suda*, and to conjectures by Ulrich von Wilamowitz-Moellendorff and Peter Paul Dobree.

88 See http://demo.fragmentarytexts.org/en/istros.html from which are also taken the screenshots reproduced in the following pages. Examples are from Berti (2009b).

89 Berti (2009b) 59–64.

Harpocration in his *Lexicon of the Ten Attic Orators* (s.v. Παναθήναια).[90] The text of Harpocration includes references to still extant sources, who are Demosthenes and Isocrates, and to three lost authors, who are Hellanicus, Androtion, and Istros. On the other hand, the tradition shows that the text of Harpocration was reused by the author of the *Suda* ([Π 152] s.v. Παναθήναια) and probably also by Photius in his *Lexicon* ([Π 376] s.v. Παναθήναια) (fig. 2.36).

The text of Harpocration has been reproduced in an abridged form by Photius in the *Lexicon* (Π 376) and by the *Suda* (Π 152):

Harpocration, s.v. Παναθήναια	Photius, *Lexicon* (Π 376)	Suda (Π 152)
Δημοσθένης Φιλιππικοῖς. διττὰ Παναθήναια ἤγετο Ἀθήνησι, τὰ μὲν καθ' ἕκαστον ἐνιαυτόν, τὰ δὲ διὰ πεντετηρίδος, ἅπερ καὶ μεγάλα ἐκάλουν. Ἰσοκράτης Παναθηναϊκῷ φησι μικρὸν δὲ πρὸ τῶν μεγάλων Παναθηναίων. ἤγαγε δὲ τὴν ἑορτὴν πρῶτος Ἐριχθόνιος ὁ Ἡφαίστου, καθά φησιν Ἑλλάνικός τε καὶ Ἀνδροτίων, ἑκάτερος ἐν Ἀτθίδος. πρὸ τούτου δὲ Ἀθήναια ἐκαλεῖτο, ὡς δεδήλωκεν Ἴστρος ἐν γ τῶν Ἀττικῶν.	Παναθήναια: ἀγὼν πεντετηρικὸς Ἀθήνησιν.	Παναθήναια: διττὰ Παναθήναια ἤγετο Ἀθήνησι, τὰ μὲν καθ' ἕκαστον ἐνιαυτόν, τὰ δὲ διὰ πενταετηρίδος, ἃ καὶ μεγάλα ἐκάλουν. ἤγαγε δὲ τὴν ἑορτὴν πρῶτος Ἐριχθόνιος ὁ Ἡφαίστου. τὰ δὲ Παναθήναια πρότερον Ἀθήναια ἐκαλοῦντο.

Figure 2.36. Istros F 4 Berti: source alignment

Figure 2.37. Istros F 22 Berti *a* and *b*

90 "Panathenaia: Demosthenes in the *Philippics* (4.35). The Panathenaia held at Athens was two-fold, one festival being held annually, and the other celebrated every five years, the latter also called the Great Panathenaia. Isocrates in the *Panathenaichus* (12.17) says 'a short time before the Great Panathenaia.' The first to conduct the festival was Erichthonius, son of Hephaistos, according to the reports of Hellanicus (FHG I 54, fr. 65 = FGrHist (BNJ) 4 F 39 = FGrHist (BNJ) 323a F 2 = Ambaglio 1980 F 162) and Adrotion (FHG I 371, fr. 1 = FGrHist (BNJ) 324 F 2 = Harding 1994 F 2), both in the first book of the *Atthis*. Before his time the festival was called the Athenaia, as Istros makes clear in the third book of his *Attika* (FHG I 419, fr. 7 = FGrHist (BNJ) 334 F 4 = Berti 2009 F 4)." See pp. 11 and 52 ff. for the Greek text of this entry, a commentary, and its treatment in the TLG.

Another interesting example is Istros F 22 Berti.[91] In this case we have two different reuses of the same lost text of Istros preserved by two sources: the *scholion* to Sophocles' *Oedipus at Colonus* 1053 (Berti F 22a) and the *scholion* to Lycophron's *Alexandra* 1328 (Berti F 22b). Editors have classified the two sources in different ways. I consider them as two parallel sources of the same fragment of the *Atakta* of Istros, given that their texts are different but they both explicitly mention Istros about the same topic (fig. 2.37).[92] Jacoby prints only the text of the *scholion* to Sophocles and adds the reference to the *scholion* to Lycophron in parentheses as a parallel text (FGrHist 334 F 22). Müller publishes the two sources as two different fragments of Istros' *Attika* (FHG I 421, frr. 20–21).

Athenaei Naucratitae Dipnosophistarum Libri XV, rec. G. Kaibel. Vol. I. Lipsiae 1887	*Thucydides. History of the Peloponnesian War II* (Books III–IV), ed. C.F. Smith. Cambridge, Ma 1958
Ath. Deipn. 5.15 (189c) ἔτι δὲ αὐλὸς μὲν τὸ ὄργανον, ὅτι διέρχεται τὸ πνεῦμα, καὶ πᾶν τὸ διατεταμένον εἰς εὐθύτητα σχῆμα αὐλὸν καλοῦμεν ὥσπερ τὸ στάδιον καὶ τὸν κρουνὸν τοῦ αἵματος· αὐτίκα δ' αὐλὸς ἀνὰ ῥῖνας παχὺς ἦλθε, καὶ τὴν περικεφαλαίαν ὅταν ἐκ τοῦ μέσου πρὸς ὀρθὸν ἀνατείνη αὐλῶπιν. λέγονται δὲ Ἀθήνησι καὶ ἱεροί τινες αὐλῶνες, ὧν μέμνηται Φιλόχορος ἐν τῇ ἐνάτη (FHG I 409 fr. 147 = FGrH 328 F 68). καλοῦσι δ' ἀρσενικῶς τοὺς αὐλῶνας, ὥσπερ Θουκυδίδης ἐν τῇ δ' (4.103.1) καὶ πάντες οἱ καταλογάδην συγγραφεῖς, οἱ δὲ ποιηταὶ θηλυκῶς.	**Thuc. 4.103 (1)** Ἐπὶ ταύτην οὖν ὁ Βρασίδας ἄρας ἐξ Ἀρνῶν τῆς Χαλκιδικῆς ἐπορεύετο τῷ στρατῷ. καὶ ἀφικόμενος περὶ δείλην ἐπὶ τὸν Αὔλωνα καὶ Βορμίσκον, ᾗ ἡ Βόλβη λίμνη ἐξίησιν ἐς θάλασσαν, καὶ δειπνοποιησάμενος ἐχώρει τὴν νύκτα. (...)

Figure 2.38. Athen., *Deipn.* 5.189c = Thuc. 4.103.1

The last case I can mention is when an extant source text quotes or alludes to another exant source text, as for example Athenaeus (*Deipn.* 5.189c) who quotes Thucydides (4.103.1). This is a clear example of a hypertext that can generate word alignments to see the differences between the two texts and how realiable is Athenaeus in his reference (fig. 2.38).[93]

Fragmentary literature has the power to generate a huge amount of possible hypertexts beyond the examples presented in these pages. For our purposes, I can classify them into two main groups: 1) hypertexts produced by extant sources that preserve quotations and reuses of other texts, and 2) hypertexts produced by critical editions of fragmentary texts that point to other sources, editions, commentaries and reference tools. Now that source editions from which fragments are extracted are becoming available in a digital form, it is possible to create a new model of editions that are truly hypertextual and that include not only excerpts but also links to scholarly sources from which those excerpts are drawn. Building a digital corpus of fragmentary authors means addressing the problem of encoding and representing both the text and the structure of a fragment.[94] It is widely

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91 Berti (2009b) 142–151.
92 See also BNJ 334 F 22ab.
93 See p. 10.
94 The following pages collect reflections published in Berti (2015b).

accepted that a digital representation of the internal and external characteristics of a text consists not simply of a mere reproductive and mechanical process, but of an interpretative act.[95] Accordingly, encoding fragments is first of all the result of interpreting them, developing a language appropriate for representing every element of their textual features, thus creating meta-information through an accurate and elaborate semantic markup. Editing fragments, therefore, signifies producing meta-editions that are different from printed ones because they consist not only of isolated quotations but also of pointers to the original contexts from which the fragments have been extracted. While editors should be able to define the precise chunks of text that they feel relevant and annotate these texts in various ways (e.g., distinguishing what they consider to be paraphrase from direct quotation), such fragments should also be dynamically linked to their original contexts and to up-to-date contextualizing information.

On a broader level, the goal of a digital edition of fragments is to represent multiple transtextual relationships as they are defined in literary criticism, which include *intertextuality* (the presence of a text inside another text, such as quotations, allusions, and plagiarism), *paratextuality* (i.e., all those elements which are not part of the text, like titles, subtitles, prefaces, notes, etc.), *metatextuality* (critical relations among texts, such as commentaries and critical texts), *architextuality* (the entire set of categories from which emerges each text), and *hypertextuality* (i.e., the derivation of a text from a preexisting hypotext through a process of transformation or imitation).[96] Designing a digital edition of fragmentary texts also means finding digital paradigms and solutions to express information about printed critical editions and their editorial and conventional features. Working on a digital edition means converting traditional tools and resources used by scholars such as canonical references, tables of concordances, and indices into machine actionable contents (cf. chapters 4 and 5).

In order to show some of the complex transtextual relations produced by quotations and text reuses, I consider an example constituted by a series of fragmentary references embedded in a long section of the *Life of Theseus* by Plutarch, which pertains to the unification of Attica and the beginning of democracy, the annexation of the territory of Megara to Attica, the institution of the Isthmian games, and the war against the Amazons.[97]

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95 Fiormonte (2003) 163–172; Apollon/Bélisle et al. (2014); Pierazzo (2015).
96 Genette (1982), part. 7–17; Landow (2006). On these categories applied to the domain of fragmentary literature, see Berti (2012) and Berti (2013a) with bibliography.
97 Plut., *Thes.* 24–28. Citation references are based on the edition of Perrin (1914) 50–66. For a visualization of these chapters with alignments of the Greek and the English texts and with annotations of text reuses, see http://demo.fragmentarytexts.org/en/plutarch.html.

In these chapters Plutarch mentions many different sources: 1) three oracles;[98] 2) the text of an inscription;[99] 3) surviving authors, such as Aristotle, Homer, Plutarch himself, and Pindar;[100] 4) a series of fragmentary historians, such as Hellanicus, Andron of Halicarnassus, Philochorus, Pherecydes, Herodorus, Bion, Menecrates, Clidemus, and the author of the Theseid.[101] Beside these sources, Plutarch adds also generic references to other unnamed authors as witnesses of his account.[102]

Figure 2.39. Bion, FHG II 19, fr. 1

The text of Plutarch has been split by Karl Müller and Felix Jacoby into extracts scattered and repeated in the sections of their collections of Greek historical fragments corresponding to the authors mentioned by the biographer.[103]   Accord-

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98   Two oracles from Delphi (*Thes.* 24.5 = Parke-Wormell II 154; *Thes.* 26.4 = Parke-Wormell II 411); one oracle of the Sibyl (*Thes.* 24.5 = Hendess 23).

99   The pillar on the Isthmus (*Thes.* 25.3). At 27.2 and 27.4, without quoting the text, Plutarch mentions also the graves of those who fell in battle and the pillar by the sanctuary of Olympian Earth.

100   Aristotle (*Thes.* 25.2 = *Ath. Pol.* 41.2; FHG II 105, fr. 2 = F 384 Rose[3]); Homer (*Thes.* 25.2 = *Ilias* 2.547); Plutarch himself (*Thes.* 27.6 = *Dem.* 19.2); Pindar (*Thes.* 28.2 = F 176 Sn.-Mae).

101   Hellanicus (*Thes.* 25.5 = FHG I 55, fr. 76 = FGrHist (BNJ) 4 F 165 = FGrHist (BNJ) 323a F 15; *Thes.* 26.1 = FHG I 55, fr. 76 = FGrHist (BNJ) 4 F 166 = FGrHist (BNJ) 323a F 16a; *Thes.* 27.2 = FGrHist (BNJ) 4 F 167a = FGrHist (BNJ) 323a F 17a); Andron (*Thes.* 25.5 = FHG II 351, fr. 13 = FGrHist (BNJ) 10 F 6); Philochorus (*Thes.* 26.1 = FHG I 392, fr. 49 = FGrHist (BNJ) 328 F 110); Pherecydes (*Thes.* 26.1 = FGrHist (BNJ) 3 F 151); Herodorus (*Thes.* 26.1 = FHG II 32, fr. 16 = FGrHist (BNJ) 31 F 25a); Bion (*Thes.* 26.2 = FHG II 19, fr. 1 = FGrHist (BNJ) 14 F 2 = FGrHist (BNJ) 332 F 2); Menecrates (*Thes.* 26.2 = FHG II 345, fr. 8 = FGrHist (BNJ) 701 F 1); Clidemus (*Thes.* 27.3 = FHG I 360, fr. 6 = FGrHist (BNJ) 323 F 18); the author of the *Theseid* (*Thes.* 28.1 = EGF 217 Kinkel).

102   *Thes.* 25.1 (φασί); 25.3 (φασί); 25.4 (ἔνιοι δέ φασιν); 26.1 (καί τινες ἄλλοι λέγουσι […] οἱ δὲ πλείους […] οὐδεὶς γὰρ ἄλλος ἱστόρηται); 27.2 (μαρτυρεῖται καὶ τοῖς ὀνόμασι τῶν τόπων καὶ ταῖς θήκαις τῶν πεσόντων); 27.4 (ἔνιοι δέ φασι); 27.5 (μαρτύριόν ἐστιν); 27.6 (λέγεται δέ καί […] φαίνονται δέ); 28.2 (παρὰ τῶν ἱστορικῶν τοῖς τραγικοῖς). On "unnamed and named quotations" in ancient sources, see Berti (2012) 456–458, and Berti (2013a) 275–276.

103   See n. 101.

26 (1) Εἰς δὲ τὸν πόντον ἔπλευσε τὸν Εὔξεινον, ὡς μὲν Φιλόχορος καί τινες ἄλλοι λέγουσι, μεθ᾽ Ἡρακλέους ἐπὶ τὰς Ἀμαζόνας συστρατεύσας, καὶ γέρας Ἀντιόπην ἔλαβεν· οἱ δὲ πλείους, ὧν ἐστι καὶ Φερεκύδης καὶ Ἑλλάνικος καὶ Ἡρόδωρος , ὕστερόν φασιν Ἡρακλέους ἰδιόστολον πλεῦσαι τὸν Θησέα καὶ τὴν Ἀμαζόνα λαβεῖν αἰχμάλωτον, πιθανώτερα λέγοντες. οὐδεὶς γὰρ ἄλλος ἱστόρηται τῶν μετ᾽ αὐτοῦ στρατευσάντων Ἀμαζόνα λαβεῖν αἰχμάλωτον. **(2)** Βίων (FHG II 19 fr. 1 📄 = FGrH 14 F 2 = FGrH 332 F 2) δὲ καὶ ταύτην παρακρουσάμενον οἴχεσθαι λαβόντα· φύσει γὰρ οὔσας τὰς Ἀμαζόνας φιλάνδρους οὔτε φυγεῖν τὸν Θησέα προσβάλλοντα τῇ χώρᾳ, ἀλλὰ καὶ ξένια πέμπειν· τὸν δὲ τὴν κομίζουσαν ἐμβῆναι παρακαλεῖν εἰς τὸ πλοῖον· ἐμβάσης δὲ ἀναχθῆναι. Μενεκράτης δέ τις, ἱστορίαν περὶ Νικαίας τῆς ἐν Βιθυνίᾳ πόλεως ἐκδεδωκώς, Θησέα φησὶ τὴν Ἀντιόπην ἔχοντα διατρῖψαι περὶ τούτους τοὺς τόπους· **(3)** τυγχάνειν δὲ

26 (1) He also made a voyage into the Euxine Sea, as Philochorus and sundry others say, on a campaign with Heracles against the Amazons, and received Antiope as a reward for his valour; but the majority of writers, including Pherecydes , Hellanicus , and Herodorus , say that Theseus made this voyage on his own account, after the time of Heracles, and took the Amazon captive; and this is the more probable story. For it is not recorded that any one else among those who shared his expedition took an Amazon captive. **(2)** And Bion says that even this Amazon he took and carried off by means of a stratagem. The Amazons, he says, were naturally friendly to men, and did not fly from Theseus when he touched upon their coasts, but actually sent him presents, and he invited the one who brought them to come on board his ship; she came on board, and he put out to sea. And a certain Menecrates , who published a history of the Bythinian city of Nicaea, says that Theseus, with Antiope on board

Figure 2.40. Bion, FGrHist 14 F 2 = 332 F 2

ingly, the result of the printed representation of these fragments is that the same text of the *Life of Theseus* is not only broken off in many excerpts, but also repeated as many times as are the authors quoted in it.[104] Moreover, given that it is not possible to clearly identify the boundaries of the quotations preserved by Plutarch, editors have adopted different criteria for extracting them, and the same fragment may have different lengths and divisions from one edition to another.[105] Digital technologies allow scholars to go beyond these limits because standards, protocols, and tools now available permit to generate a model that can express the hypertextual and hermeneutical nature of fragmentary texts, providing an interconnected corpus of primary and secondary sources of fragments that also includes critical apparatuses, commentaries, translations, and modern bibliography on ancient texts. The first requirement for building a digital collection of fragmentary texts is to make the semantic contents of printed critical editions machine readable, defining a general architecture for representing at least the following main hypertextual elements that pertain to the domain of historical fragmentary texts.[106]

1) *Quotation as machine actionable link.* The passage of the *Life of Theseus* should be linked to the whole context of still extant sources and to editions of lost

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104 On this problem for digital libraries, see p. 57.

105 Fig. 2.39 shows in blue the portion of text extracted by Müller and printed in the FHG. Fig. 2.40 shows in red a different portion of text for the same fragment extracted by Jacoby and printed in the FGrHist. Different *cut, copy, and paste* methods used for the same fragment in different editions are noticeable in the case of Philochorus (FHG I 392, fr. 49 = FGrHist 328 F 110) and Clidemus (FHG I 360, fr. 6 = FGrHist 323 F 18). There is also an example where the same fragment of Hellanicus has two different lengths within the same collection: FGrHist 4 F 167a and FGrHist 323a F 17a. Finally Hellanicus, FHG I 55, fr. 76 partially corresponds to four different fragments in Jacoby (FGrHist 4 F 165 = FGrHist 323a F 15 and FGrHist 4 F 166 = FGrHist 323a F 16a). For a digital and dynamic visualization of these differences, see http://demo.fragmentarytexts.org/en/plutarch.html.

106 Berti/Romanello et al. (2009); Romanello/Boschetti et al. (2009); Romanello (2011).

authors cited by Plutarch.[107] On the other hand, editions of fragments should be linked to the whole text of the *Life of Theseus*. This is the first function for a proper representation of fragmentary texts to see each fragment directly within its context of transmission and avoid the misleading idea of an independent material existence of fragmentary texts, which derives from typographical representation of excerpts that are actually the result of modern reconstructions of lost works.[108]

2) *Start and end of a fragment.* The next step is to provide a mechanism for marking the beginning and the end of a fragment in its context according to the choices of different editors. The result is that a scholar, while reading the excerpt inside its source of transmission, is able to visualize simultaneously how different editors have extracted different portions of text from the same context in order to generate a fragment. As we will see in chapter 3, the ultimate goal of a new born-digital edition of fragmentary texts is to go beyond the problem of defining borders of text reuses and to produce what we could call *borderless fragments*. This expression means that the result is not a chunk of text extracted from the context, but a collection of annotations that mark up different elements pertaining to a text reuse within its context of transmission.[109] This function has another important advantage in a digital library because it eliminates the problem of the repetition of the same text inside a collection, as it happens for example in the TLG (see pp. 57 ff.)

3) *Numbering and ordering fragmentary authors and fragments.* Numbering and ordering fragmentary authors and their fragments may vary in a significant way from one edition to another. These differences depend on the choices of the editor, who can decide to date and classify authors and order fragments according to different internal and external characteristics of the fragments themselves and of their sources.[110] Differences may also be the result of different fragmentations of the same text or of the need to add new authors and texts to a collection of fragments. My model provides the possibility of encoding this kind of information, which is usually registered in the table of concordances of a printed edition. Aligning multiple references to the same textual object can help readers visualize different numberings and orderings of fragments in different editions, and the model also permits to include new data if new editions are added.[111]

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107 E.g., Homer and Aristotle, and Hellanicus and Philochorus in the FHG and the FGrHist.

108 On the role of the context, see section 2.3.

109 I have coined the expression *borderless fragment* from the concept of "borderless electronic text" described by Landow (2006) 110–118.

110 In the FHG, Greek fragmentary historians are arranged chronologically, while in the FGrHist they have a sequential number and are organized by genres. Fragments are grouped by works inside both collections: see section 1.4.

111 See section 3.2 on the use of the *CITE Architecture* for this purpose. See also section 4.4.3 for the digital table of concordance between the FHG and the FGrHist.

4) *Representing information about fragmentary authors and works.* The sources that transmit fragments may include many elements that reveal the presence of the textual reuse, such as the name of a fragmentary author, the title or the description of a fragmentary work, and other references to a fragmentary work passage as for example the book number. Attributing a fragment to an author and a work can be a difficult task, because there are homonymous authors and also because managing titles of ancient works can be quite challenging.[112] Witnesses do not always cite work titles, and in ancient times titles were not fixed and definitive as nowadays because they could be referred to with variants and in the form of a description of the work content. The result is that different editors may attribute the same fragment to different authors and works.[113] The goal is to develop a comprehensive catalog with unique identifiers for every fragmentary author and work that will include multiple expressions of the same author and work and where each entry will have associated metadata, providing scholars with a sort of canon that simultaneously includes all available information on fragmentary authors and works, with pointers to primary and secondary sources (cf. section 5.6). This function can help enhance one of the "theoretical questions" suggested by Glenn Most when collecting fragments, which is the relationship between fragmentary authors and the "shifting boundaries of canon formation over time."[114]

5) *Classifying fragments.* Fragmentary authors and works are classifiable according to multiple criteria that range from internal to external factors. The first classification is based on literary genres and subgenres that have led scholars of printed editions to generate very complex categories for arranging authors and texts within their collections (cf. sections 1.2 and 1.4). Another traditional way of classifying fragments is distinguishing them between *testimonia* (i.e., fragments providing biographical and bibliograpical information about fragmentary authors) and *fragmenta* (i.e., actual text reuses of lost works). The printed representation of these categories has many limitations because it is impossible to draw a demarcation line among many different genres of fragmentary authors and works that can be inserted in different overlapping categories. The result again is that the same fragment is often repeated in many different sections corresponding to different categories.[115] A digital collection in which every fragment

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112 See the example of Crates of Athens and Crates of Mallus, who are both considered possible authors of a work on Attic glosses attributed by ancient sources to a not further specified Crates: Broggiato (2000). On titles in Greek literature see Castelli (2020).

113 See Harding (2008) 1 on the different ways in which ancient authors refer to the works of the Atthidographers. See Berti (2009b) 6–8 on the different forms of the title of the work on Athens of Istros the Callimachean.

114 Most (1997) vi. On the Alexandrian canon and the "canons" of ancient Greek historiography, see Nicolai (2013) and Matijašić (2018).

115 Cf. Berti (2013a) 271–272.

is preserved in its original context and represented with multiple pieces of metadata can express the complexity of modern classifications, while not scattering and repeating the same excerpt many different times. In this way, it is possible to avoid the strictness of printed categories, allowing scholars to compare a fragment with many other excerpts and visualizing its belonging to different categories in a more dynamic and simultaneous way.

2.3 Cover-Text: From Fragments to Text Reuses

When 16th century humanists began to collect fragments of textual sources, the main interest was in revealing and publishing the best traces of the most important authors of Classical antiquity. Later scholarship established philological and rigorous methods to find every possible evidence about lost authors, focusing the attention on the concept of *textual fragment* and therefore producing big collections of fragmentary authors and works, upon which we still depend for our knowledge of otherwise unknown literary figures of ancient times.[116]

Recent scholarship developed during the 20th and the 21st century has been moving the attention from the *fragment* to the *context* that preserves it. In an important paper concerning fragmentary historiography, Guido Schepens has coined the term *cover-text* to explain and define the complexity of extracting "fragments" from their source of transmission: "[...] the methodological key-problem the student of (historical) fragments has to face is invariably a problem of context: either there is no context for giving (some) meaning to a detached quotation, or only a drastically reduced context [...], or there is another context: the one of the work written by a later author in which the 'fragment' (how inappropriate is the term!) supposedly survives in some form. The latter is the way the great majority of fragments of historical works have survived, a fact which entails important consequences as to method. Of course, the context of the later work must not always entail a distortion of the original meaning of a fragment, but it often does. The student of historical fragments should be aware of the fact that his basic working material — the texts quoted with the author's name — consists for the greater part of references that are made with a special purpose, mostly in a critical or polemical spirit. We know that ancient historians, when they wanted to take advantage of what their predecessors had written, usually preferred an anonymous reference to one by name. As a rule they only cited their precursor's name when they disagreed or wanted to show off their better knowledge. This tendency carries two important methodological implications.

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116 See section 1.2.

First, the reference by name always needs to be examined critically before we can think of using it as evidence for reconstructing the contents of lost works. [...] In view of the paramount importance of the analysis of the (con)text of the later works in which the 'fragments' survive, one could perhaps think of calling these works *cover-texts*. Apart from being a convenient short-hand, the notion 'cover-text' conveys — I believe, better than the phrases commonly used ('sources of fragments' or expressions like the 'citing' or 'quoting' later authors) — the consequential and multiple functions these texts perform in the process of transmitting a fragment. [...] the word 'cover' has the triple meaning of: to conceal, protect or enclose something. These are all activities which the later authors perform (or can perform) when transmitting a precursor text: they, first of all, *preserve* (= protect from being lost) texts drawn from works that are no longer extant; very often, too, they more or less *conceal* the precursor text (for characteristics such as the original wording and style of the precursor text are no longer discernible; often also fragments seem to 'hide' in the cover-text, so that one can only guess where a paraphrase begins or where a quotation ends); and, last but not least, the cover-text *encloses* the precursor text: it is inserted or enveloped in a new context, which may impose interpretations that differ considerably from the original writer's understanding of his text. [...] Much work on Greek historiography still fails sufficiently to take into account the full implications of the fact that in many cases we are dependent on cover-texts. [...] Second, any study of fragments needs, if possible, to be supplemented, though under stricly limited conditions, by an examination of the indirect tradition: such an investigation must always take the named fragments as its starting-point, lest it end up in the speculative, circular arguments of unwarranted *Quellenforschung*."[117]

Guido Schepens points at two fundamental components of modern philological methods for dealing with fragmentary texts: 1) the role of the context that transmits information about lost texts by citing and quoting them in many different ways, and 2) the necessity of a careful examination of the indirect tradition of lost texts, which means a comparison between the context of the fragment and other sources. Schepens doesn't use the expressions *text reuse* and *textual alignment*, which are now key terms of many projects in the digital and computational humanities for exploring and developing techniques of text reuse detection and intertextual services. The goal of these services is to semi-automatically identify and represent relations and reuses of texts that include phenomena such as quotations, allusions, paraphrases and plagiarism.

In the three following sections, I introduce new projects that have been applying text mining techniques to historical sources for text reuse detection and intertextual alignment. The application of these techniques to historical texts is

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117 Schepens (1997) 166–167. Cf. also Grafton (1997) 143 and Gorman/Gorman (2014) ch. 3.

still at the beginning and definitely needs more data and further developments. Nevertheless, it is very interesting to see how recommendations expressed by traditional philologists like Guido Schepens and experiments performed by digital philologists are converging into the idea of focusing the attention on primary sources and of carefully exploring them as precious contexts of transmission of further information about the ancient world.

2.3.1 Text Reuse Detection

In the last ten years many experiments have been carried out for applying text reuse detection techniques to many different kinds of textual and electronic resources.[118] Experiments and projects are also currently in progress for applying these techniques to historical documents.[119] In this case, the detection is performed for text reuses of still surviving sources where it is possible to compare the reuse with the original text from which the reuse itself derives. As we have seen in section 1.3, most of what was written in Classical antiquity has been lost and now we rely on reuses of a lost textual heritage. The development of technologies for detecting reuses of lost texts has still to come and, as we will see in the next chapters, it still requires the creation of more digital resources and the preparation of training data.[120]

The Proteus Project. This is a project developed at the Center for Intelligent Information Retrieval at the University of Massachusetts Amherst for building and evaluating research infrastructure for scanned books.[121] The goal of the

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118 Barrón-Cedeño/Basile et al. (2010); Sánchez-Vega/Villaseñor-Pineda et al. (2010); Trillini/ Quassdorf (2010); Smith/Manmatha et al. (2011); Alzahrani/Salim et al. (2012); Smith/ Cordell et al. (2013); Ganascia/Glaudes et al. (2014); Smith/Cordell et al. (2014); Colavizza/Infelise et al. (2015). On text reuse detection from the web, see Potthast/Hagen et al. (2013) and Hagen/Potthast et al. (2017). Martin Potthast has been also implementing *Picapica*, which is a text reuse search engine for comparing a text to *Wikipedia* in ten modern languages (English, German, Spanish, French, Italian, Dutch, Swedish, Portuguese, Catalan and Basque): http://www.picapica.org.

119 Lee (2007); Bamman/Crane (2008b); Bamman/Crane (2009); Büchler/Geßner/Eckart et al. (2010); Büchler/Geßner/Heyer et al. (2010); Büchler/Crane et al. (2012); Büchler/Crane et al. (2013); Büchler (2013); Büchler/Geßner et al. (2013); Büchler/Burns et al. (2014); Gorman/ Gorman (2016); Pöckelmann/Dähne et al. (2020). Text reuse detection is also now part of KITAB (*Knowledge, Information Technology, and the Arabic Book*), which is a project for studying the formation and development of the written Arabic tradition with digital methods: http://kitab-project.org.

120 I'm very grateful to the German Federal Ministry of Education and Research (BMBF) for supporting the *Historical Text Reuse Data Workshop* that I organized at the University of Leipzig on July 12–13, 2017 and that offered many fruitful discussions on text reuse of historical sources.

121 http://books.cs.umass.edu/mellon

project (*Proteus Books*) is to work with unstructured scanned book collections, as for example the *Internet Archive*, and help scholars in the humanities navigate and use them in an easier way. The project has five components: 1) language identification, 2) duplicate detection, 3) duplicate alignment, 4) entity extraction, and 5) quotation detection. The project has identified the language of 3,628,227 OCRed books from metadata of the *Internet Archive*, individuating also language identification differences and errors.[122] *Proteus* has then acquired the canonical text of 803 English works and of 401 Latin works from the *Perseus Digital Library*, in order to compare them with English and Latin OCRed books from the *Internet Archive* and find full and partial duplicates of the canonical works. After performing duplicate detection, the OCRed text of duplicates have been aligned with the text of canonical works to identify corresponding portions of the works. *Proteus* has also performed Named Entity Recognition on 1,072,356 books from the *Internet Archive* to identify people, places, organizations and things, and visualize them in a JSON format. In addition to NER, the project has been working on finding matching quotations to see all occurrences of quotations of canonical works in OCRed books from the *Internet Archive*, including commentaries and not only copies of canonical works. An example is the *Germania* by Tacitus, which is identified as `urn:cts:latinLit:phi1351.phi002` in the *Perseus Catalog*. *Proteus* allows scholars to read sections of the work and visualize portions of text that have been identified as quotations in OCRed volumes from the *Internet Archive*. The system provides an alignment between the canonical text of works and the OCRed output with links to page images of the relevant OCRed book (fig. 2.41).[123]
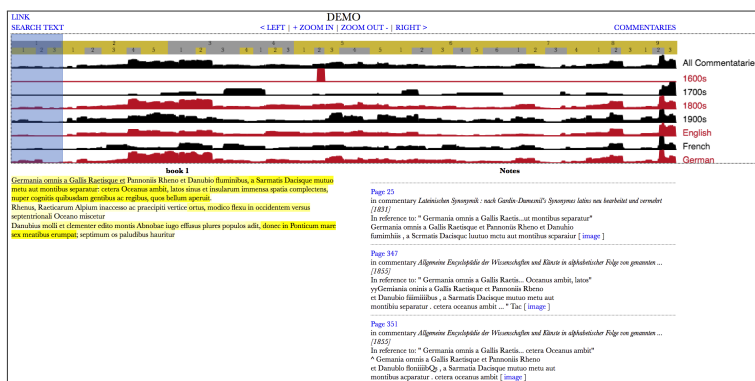
Figure 2.41. *The Proteus Project*: quotations of Tacitus' *Germania* in OCRed books

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122 *Proteus* uses ten languages: English, French, German, Spanish, Italian, Latin, Portuguese, Dutch, Danish and Swedish.

123 http://books.cs.umass.edu/mellon/quotes/hb/urn:cts:latinLit:phi1351.phi002

eTRAP (*Electronic Text Reuse Acquisition Project*). This is a text reuse project also with a focus on historical languages.[124] The project has been developing the TRACER machine, which is a command line engine for text reuse detection written in Java. The goal is to semi-automatically detect text reuse between two or multiple texts in the same language. The project provides guidelines for preparing *corpora* that can be analyzed with TRACER and the machine is continuously improved thanks to the feedback gathered by tutorials and workshops organized by eTRAP at international conferences and events.[125] The project has been developing two related research works: the *Digital Breadcrumbs of Brothers Grimm* and the *Tracing Authorship In Noise* (TrAIN) for detecting traces of the Brothers Grimm's tales and authorship attribution.

TRAVIz (*Text Reuse Alignment Vizualization*). eTRAP makes also use of TRAVIz, which is a JavaScript library that "generates visualizations for Text Variant Graphs that show the variations between different editions of texts."[126] As stated on the website of the project, TRAViz supports the collation task by providing methods to align various editions of a text, visualize the alignment, improve the readability for Text Variant Graphs compared to other approaches, and interact with the graph to discover how individual editions disseminate. The project provides examples with different English and German translations of the *Bible*.

Text reuse detection experiments have been also carried out as part of the project eAQUA (*Extraktion von strukturiertem Wissen aus Antiken Quellen für die Altertumswissenschaft*), which was developed at the University of Leipzig for the application of text mining methods and techniques to ancient Greek and Latin sources.[127] The first phase of the project (2008–2011) included 8 sub-projects: 1) *Projekt Atthidographen*, 2) *Projekt Platon*, 3) *Projekt Metrik*, 4) *Projekt Camena*, 5) *Projekt Inschriften*, 6) *Projekt Papyri*, 7) *Projekt Fehlererkennung*, and 8) *Projekt Mental Maps*.[128] The second phase of the project (2011–2013) further applied text mining techniques to specific research questions arising from sources related to the Atthidographers (co-occurrences) and Plato (quotations and text reuses). eAQUA has an online portal where it is possible to read information about the project and access demo versions of the tools *Kookkurrenz-Analyse* and *Zitationen*. Both tools analyze data from different *corpora* that are free or protected by copyright. Co-occurrences are searchable in the free *corpora* of the *Codex Sinaiticus*, the *Deutsches Textarchiv* (DTA), *Epiduke* (Duke Databank of Documentary Papyri), *Herodot*, PHI *Latin Texts* (PHI 5) and the *Perseus Digital Library* (Greek,

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124 https://www.etrap.eu
125 Büchler (2013); Büchler/Burns et al. (2014).
126 See http://www.traviz.vizcovery.org, Jänicke/Geßner et al. (2014), and Yousef/Janicke (2021).
127 http://www.eaqua.net
128 Schubert/Heyer (2010); Schubert (2011).

Latin, and Renaissance Shakespeare).[129] Limited to accounts belonging to the project is the access to the *Bibliotheca Teubneriana Latina* (BTL), the *Patrologia Latina* (PL/ML) and the *Thesaurus Linguae Graecae* (TLG CD-ROM E). The tool *Zitationen* offers access to the free *corpora* of the PHI *Latin Texts* (PHI 5) and the *Perseus Digital Library* (Greek and Latin), and through a limited account to the *corpus* of the *Thesaurus Linguae Graecae* (TLG CD-ROM E).
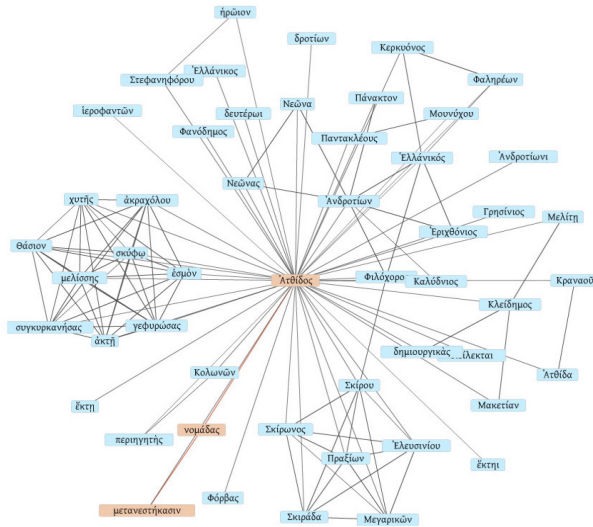
Figure 2.42. eAQUA: graph of Ἀτθίδος

As far as lost authors are concerned, eAQUA has published experimental results on the *Atthidographers*, which is an expression alluding to a literary genre that includes a group of ancient Greek local historians who wrote about Athens and Attica but whose works are now lost.[130]

An example is the use of the term Ἀτθίδος, which is the genitive of the adjective Ἀτθίς used as a title of histories of Attica written by the Atthidographers: ἡ Ἀτθίς (συγγραφή) (*Atthis* and plural *Atthides*).[131] eAQUA has analyzed co-occurences of Ἀτθίδος in the TLG (CD-ROM E) and has produced visualizations through graphs, revealing in this way interesting connections about the use of this work title in ancient Greek literature.[132] The online tool *Kookkurrenz-Analyse* allows to search and visualize lists of co-occurrences of ancient Greek words, including Ἀτθίδος on which are based the results presented by Schubert

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129 On the use of *Epiduke* through eAQUA, see Reggiani (2017) 186–187.
130 Jacoby (1949); Berti (2009b) (*Introduzione*); Bearzot/Landucci (2010); Schubert (2010a).
131 Jacoby (1949) 80; Harding (1994) 1; Berti (2009b) 7–8.
132 See fig. 2.42; Bünte (2010); Schubert (2011) 38–44.
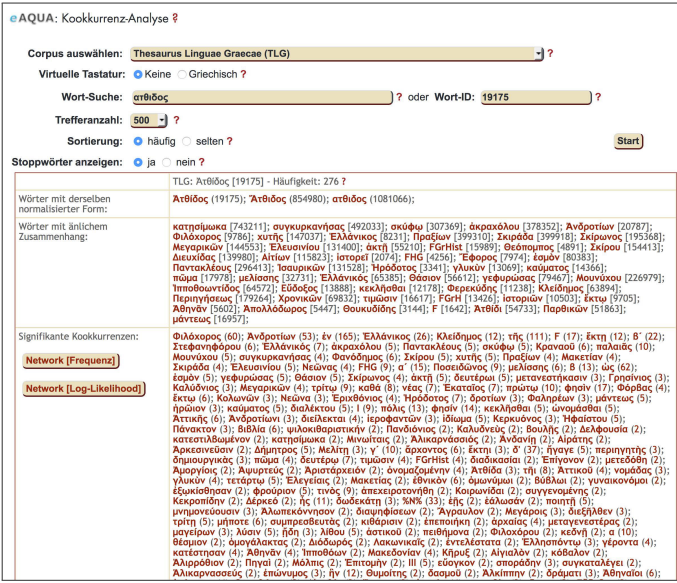
Figure 2.43. eAQUA: co-occurrences of Ἀτθίδος
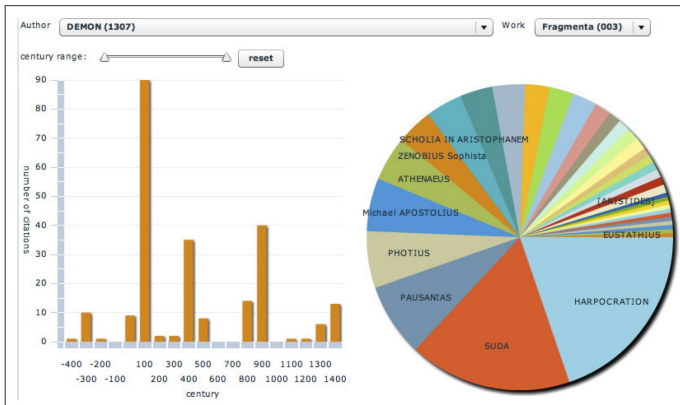
Figure 2.44. eAQUA: witnesses of Demon

(2011).[133] Other experiments in eAQUA have been performed using the *Citation-Graph* to visualize sources preserving quotations and text reuses of the lost works of the Atthidographers.[134]

Figure 2.44 shows an example of visualization of the sources that preserve text reuses of the lost work of the Atthidographer Demon. Charlotte Schubert has also experimented with text reuses of Clidemus. The *CitationGraph* doesn't reveal new fragments of the lost Atthidographer, but allows to visualize the reuses of his lost works with a perspective not dependent on the editorial selections and arrangements of scholars who have published editions of Clidemus' fragments.[135] These tools still need further developments and the ingestion of other digital sources to produce more results and try to obtain previousy unexplored relations among texts.[136] In any case, they already offer a first set of experimental functions and visualization possibilities that allow scholars to go beyond the limits of traditional printed editions where the selection and the presentation of source texts of fragmentary authors strongly depend on the decisions of the editor.[137]

Trismegistos (reuse of texts). A special and in some way related case of "reuse of texts" is presented by the project *Trismegistos*.[138] This case concerns physical documents and the reuse of papyri, stones and other materials as writing surfaces, which was a very common practice in antiquity. Text reuse is not the focus of *Trismegistos*, but its team has been starting to devote a section of the project with different categories for specifying if there is a relation among texts written on the same physical objects.[139] Even if strictly related to the material reuse of writing objects, this tool has the possibility to expand and reveal relations among ancient

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133 See fig. 2.43; Schubert (2018).
134 Bünte (2010); Schubert (2010b).
135 Schubert (2010b) 51–54.
136 For example, the project still includes the texts of the CD-ROM version E of the TLG, which is now superseded by the online version that constantly adds new sources to the TLG *corpus*.
137 Cf. Schubert (2010b) 54. eAQUA and its *CitationGraph* were also used for a new research on the lost author Ephippus of Olynthus and Nicobule: Pfeil (2013). Other results in eAQUA have been published for detecting quotations in still extant sources, like Plutarch and Plato: Schubert (2010b); Schubert/Klank (2012); Schubert (2017); Geßner (2010). As far as the reception of Plato in antiquity is concerned, further research is now developed as part of the project *Digital Plato* at the University of Leipzig: Pöckelmann/Ritter et al. (2017); Schubert (2019); Pöckelmann/Dähne et al. (2020).
138 See https://www.trismegistos.org/tm/search_reuse.php. On *Trismegistos* see p. 69.
139 There are many different cases where texts could be written on an object because related or not related to the text already written on it. *Trismegistos* provides an experimental search engine for exploring "sets of texts connected with reuse." Interesting examples are documents that were joined in a second stage for their users' convenience and because of their complementary contents. In this cases *Trismegistos* provides specific categories for these types of connection.

texts generating further search criteria and types of reuse with the addition of new records and the collaboration with other projects.

2.3.2 Intertextual Analysis

Strictly connected to text reuse is the concept of *intertextuality*, which aims at exploring the intricate structure of meaningful relationships between texts. As for Classical sources, the theory of intertextuality was originally developed in the field of Latin literature, but is now expading to cover other genres as for example Greek historiography.[140] Digital philologists have been recently explored methodologies for digitally representing intertextuality and for training and testing the machine to automatically detect intertextual matches between historical texts.[141] Taking into consideration the complexity of historical sources and the lack of complete and fully comprehensive digital *corpora*, a lot of work has still to be done in order to prepare data and get proper results from it. Nevertheless, the tools that I present in this section are already generating interesting results that could be expanded with more data and a bigger involvement of the scholarly community.

Tesserae. Tesserae is a collaborative project of the Departments of Classics and Linguistics of the University at Buffalo, the Department of Computer Science and Engineering of the University of Notre Dame, and the Département des Sciences de l'Antiquité of the University of Geneva.[142] The project offers a free and open web interface for exploring intertextual parallels and detecting allusions in Latin poetry by generating lists of lines that share two or more words within a single line or phrase regardless of inflectional changes.[143] *Tesserae* makes use of *corpora* from different databases, such as *The Latin Library*, the *Perseus Digi-*

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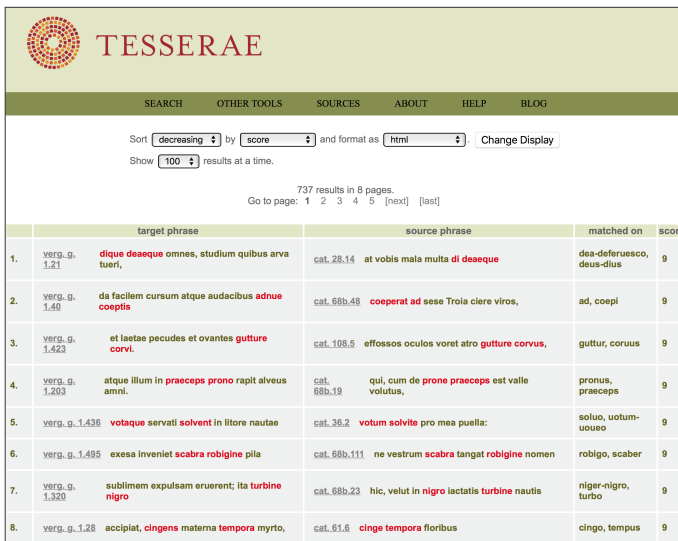
140 Berti (2012) 442–446 with bibliography; Coffee/Koenig et al. (2012) 383–384; Coffee (2018). On the application of intertextual concepts to Classical historiography, see the papers on *Allusion and Intertextuality in Classical Historiography* presented at the APA Annual Meeting in San Antonio (Jan. 8, 2011), and on *Historiography, Poetry, and the Intertext* and *Intertextual Relationships Between Poetry, Prose and Historiography* presented at the APA Annual Meeting in Seattle (Jan. 4, 2013) and at the CA Annual Conference in Reading (Apr. 6, 2013). These papers are available online on the website of *Histos. The On-line Journal of Ancient Historiography*. On *intratextuality*, which is the interaction between parts of the same text or body of texts within a single author, see Harrison/Frangoulidis et al. (2018).

141 On how hypertext is "a fundamentally intertextual system," see Landow (2006) 55.

142 See http://tesserae.caset.buffalo.edu that offers the new version (5) of the project. Version 3 is currently updated to continue its functionality. Examples in this book are taken from version 3.

143 See Coffee/Koenig et al. (2013) for an evaluation of *Tesserae* search methods by comparing book 1 of Lucan's *Civil War* with Vergil's *Aeneid*. See also Forstall/Coffee et al. (2015), Coffee (2018), and Coffee (2019).

tal Library, DigilibLT (*Digital library of late-antique Latin texts*), the *Open Greek and Latin* project, *Musisque Deoque*, and the *Corpus Scriptorum Latinorum*.[144] As of 2021, the project allows to begin testing with Greek and English texts, and offers other experimental tools: Latin Multi-Text Search (cross-references discovered parallels against the rest of the Latin corpus), Greek Multi-Text Search (cross-references discovered parallels against the rest of the Greek corpus), LSA Search Tool (search for thematic similarities even where phrases have no words in common), Tri-gram visualizer (customizable, color-coded visualization of 3-gram concentrations), Full-text display (displays the full text of the poems with references highlighted in red), and Lucan-Vergil benchmark test (perform a search of Lucan's *Pharsalia* Book 1 against Vergil's *Aeneid*, and compares the results against a 3000-parallel benchmark set).

Figure 2.45. *Tesserae*: comparison of Catullus' *Carmina* with Vergil's *Aeneid* book 1

Figure 2.45 shows the example of a comparison between Catullus' *Carmina* and the first book of the *Aeneid* of Vergil. The search generates 737 results and in each case displays two common words between the *target text* (alluding text: Vergil) and the *source text* (alluded-to text: Catullus). Advanced search options allow users to set different parameters such as units to be compared (lines or phrases), features to be matched across texts (exact word, lemma, semantic match, lemma + semantic match, and sound), number of stop words and the stoplist basis to

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144 Texts from these databases are modified by changing the markup and sometimes also the orthography, and by removing all punctuation and capitalization.

determine frequencies for the stoplist, score and frequency basis for getting rarer words closer together, and maximum distance and distance metric to exclude matching words that are too far from each other. Results allow to visualize highlighted matching words, to re-sort results with sort options, to read both target and source texts in their entire context, and to export data in CSV, TSV, and XML formats. Regarding Latin poetry, the automatic detection of parallel phrases in *Tesserae* is producing promising results. As reported by the team of the project, it "recovers approximately a third of the parallels captured by traditional commentators, and adds a third not previously recorded."[145] As far as prose texts and Greek sources are concerned, the tool allows users to explore intertextual parallels and obtain many results that need to be further selected and verified in order to test the effectiveness of the algorithms.

TLG *Intertextual Phrase Matching*. As part of new features offered by the online version of the *Thesaurus Linguae Graecae* (TLG), there is also a tool for intertextual phrase matching. The service is based on n-gram comparison (bigrams and trigrams) for detecting sequences of two or three content words shared between two texts in order to identify common text passages.[146] N-grams are used in the TLG for 1) comparing two texts or two authors side by side (*N-Grams*), 2) for seeing attestations of phrases in the *corpus* (*Browse – Browse one text*), and 3) for selecting two passages and viewing their similarities (*Browse – Parallel browsing*).[147]

A first example is a comparison between the *Historiae* of Thucydides (ed. Jones-Powell: `tlg0003.001`) and all texts of Athenaeus of Naucratis (`tlg0008`).[148] Figure 2.46 shows 8 results, 6 of which have as a target text the *Deipnosophists* and 2 the *epitome*. As for the *Deipnosophists*, there are matches in books 5, 9, 10 and 11. Passages in books 5 and 11 have been also detected in printed editions of the *Deipnosophists* by August Meineke, Georg Kaibel, and Douglas Olson.[149] Passages in books 9 and 10 are not referred to in printed editions and seem not to be relevant.[150] As for the *epitome*, only the passage from the summary of book 11 of the *Deipnosophists* is pertinent.[151] Missing are a direct quotation of a passage

145 Coffee/Koenig et al. (2012) 386.

146 The comparison is based on lemmata and the order of words within n-grams is ignored. Stop-words that don't contribute to the meaning of the comparison are removed.

147 Descriptions of these tools are available on the TLG website. For a recent review of the TLG intertextual phrase matching, see Boogert (2019).

148 The texts of Athenaeus in the TLG are constituted by the *Deipnosophists* (ed. Kaibel: `tlg0008.001`), one fragment of *On the kings of Syria* (FGrHist 166 F 1: `tlg0008.002`), and the *epitome* of the *Deipnosophists* (ed. Peppink: `tlg0008.003`).

149 Ath., *Deipn.* 5.55 = 215f and 216a = Thuc. 4.96.5, 8; *Deipn.* 11.57 = 478f = Thuc. 7.87.2. The passage in book 11 is one, but the TLG has chopped it up into two consecutive matches because it is an extended passage.

150 Ath., *Deipn.* 9.29 = 383a = Thuc. 4.50.2; *Deipn.* 10.87 = 458a = Thuc. 5.111.4.

151 Ath., *Epit.* 2.2.58.10 Peppink = Thuc. 7.87.2.

from Thucydides and of course direct references to his name without quotations or paraphrases of his text.[152]

Figure 2.46. TLG intertextual phrase matching: comparison of Thucydides with Athenaeus

Concerning lost texts, we can try to compare the fragments of Istros the Callimachean (`tlg1450`) with Athenaeus of Naucratis (`tlg0008`).[153] In this case, we obtain 19 results (partial screenshot in fig. 2.47). Considering that passages are chopped up into consecutive matches, the actual detected fragments are four from the *Deipnosophists* and the *epitome* (frr. 14, 35, 38, 43) and they correspond to all those published in the FHG. In this case, the intertextual phrase matching is useful to align the lost text of the fragments as they were edited by Karl Müller in the FHG and the original text of the *Deipnosphists* in the edition by Kaibel and of the *epitome* in the edition by Peppink.

Through the TLG *Parallel browsing* it is also possible to select one fragment of Istros and compare its text in the edition of the FHG with the whole context of the passage of the *Deipnosophists* in the edition by Kaibel (e.g., fr. 14 in fig. 2.48). As part of the *comparing* functions, the TLG now offers also the possibility

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152 Ath., *Deipn.* 1.42 = 23b = Thuc. 1.70.5 (the quoted passage is νικώμενοι ἐπ᾽ ἐλάχιστον ἀναπίπτουσιν, which is detected in the text of the *Deipnosophists* when enabling n-grams in the *Browse one text* section of the TLG); *Deipn.* 3.73 = 108f = Thuc. 7.33.4; *Deipn.* 5.15 = 189c = Thuc. 4.103.1; *Deipn.* 5.55 = 215d = Thuc. 5.2.1.

153 Istros' fragments in the TLG are from Müller's FHG (`tlg1450.004`) and from Mette (1978) (`tlg1450.003`).

Figure 2.47. TLG intertextual phrase matching: comparison of Istros with Athenaeus

Figure 2.48. TLG parallel browsing: Istros, FHG I, fr. 14 and Ath., *Deipn.* 13.4

to compare two editions of the same text. In this case the TLG uses differences between individual word forms, beta escapes, and punctuation in order to capture finer distinctions between texts than with n-grams. The TLG provides the current available list of texts with multiple editions with the goal of expanding it over time.

2.3.3 Translation Alignment

Text reuses and intertextual parallels can be analyzed and detected also across different languages. Figure 2.49 shows a passage of Livy (30.45), who explicitly refers to Polybius (16.23) about the presence of the king Syphax in the triumphal march of Scipio to Rome. Given that the Greek text of Polybius is preserved, it is possible to compare it with its Latin reuse and generate an alignment of the corresponding words.[154] Many other examples are also offered in the field of fragmentary literature, were original texts are lost. Figure 2.50 shows a passage of the *Astronomica* of the Latin polymath Hyginus (2.40) mentioning the lost Greek author Istros the Callimachean about Koronis (FGrHist 334 F 66 = BNJ 334 F 66). Given that we don't have the original text, it is not possible to check the accuracy of the reference of Hyginus, except for speculating about the words that could possibly derive from Istros' work, whose name is the only evidence in the passage of Hyginus.

Machine translation tools have been developed for "automatically producing in a target language the translation of a text in a source language." These tools are devised for translations of everyday texts written in modern languages and not for literature or poetry. Results are still not really satisfactory because translation is a very difficult task that requires a profound knowledge and comprehension of the text that has to be translated, and because machines still need a lot of training.[155]

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154 Corresponding words are red in the figure. The page is available at http://demo.fragmen tarytexts.org/en/istros/digital-edition/digital-edition-exploring-text-re-uses-across-lang uages.html, where it is also available an XML output of the alignment produced with the translation alignment editor of the *Alpheios* project.

155 For an introduction to the development of automatic machine translation since the Second World War, see Poibeau (2017). For an overview of the revolutionary effects that online translation services and crowdsourced translations are producing and for their implications for human languages, cultures and society, see Cronin (2013).

Livius 30.45: (2) ... Romam pervenit triumphoque omnium clarissimo urbem est invectus. (3) argenti tulit in aerarium pondo centum uiginti tria milia. militibus ex praeda quadringenos aeris diuisit. morte subtractus spectaculo magis hominum quam triumphantis gloriae Syphax est, (4) Tiburi haud ita multo ante mortuus, quo ab Alba traductus fuerat. conspecta tamen mors eius fuit quia publico funere est elatus. (5) — hunc regem in triumpho ductum Polybius, haudquaquam spernendus auctor, tradit. — secutus Scipionem triumphantem est pilleo capiti imposito Q. Terentius Culleo, omnique deinde uita, ut dignum erat, libertatis auctorem coluit.

Polybius 16.23: (4) ... ὡς δὲ καὶ τὸν θρίαμβον εἰσῆγε, (5) τότε καὶ μᾶλλον ἔτι διὰ τῆς τῶν εἰσαγομένων ἐνεργείας μιμνησκόμενοι τῶν προγεγονότων κινδύνων ἐκπαθεῖς ἐγίνοντο κατά τε τὴν πρὸς θεοὺς εὐχαριστίαν καὶ κατὰ τὴν πρὸς τὸν αἴτιον τῆς τηλικαύτης μεταβολῆς εὔνοιαν. (6) καὶ γὰρ ὁ Σόφαξ ὁ τῶν Μασαισυλίων βασιλεὺς ἤχθη τότε διὰ τῆς πόλεως ἐν τῷ θριάμβῳ μετὰ τῶν αἰχμαλώτων: ὃς καὶ μετά τινα χρόνον ἐν τῇ φυλακῇ τὸν βίον μετήλλαξε. (7) τούτων δὲ συντελεσθέντων οἱ μὲν ἐν τῇ Ῥώμῃ κατὰ τὸ συνεχὲς ἐπὶ πολλὰς ἡμέρας ἀγῶνας ἦγον καὶ πανηγύρεις ἐπιφανάς, χορηγὸν ἔχοντες εἰς ταῦτα τὴν Σκιπίωνος μεγαλοψυχίαν.

Livius 30.45: (2) ... (Scipio) reached Rome and rode into the city in the most distinguished of all triumphs. (3) He brought into the treasury one hundred and twenty-three thousand pounds weight of silver. To his soldiers he distributed four hundred asses apiece out of the booty. The death of Syphax withdrew him rather from the eyes of spectators than from the glory of the triumphing general. (4) He had died not long before at Tibur, to which he had been transferred from Alba. Nevertheless his death attracted attention because he was given a state funeral. Polybius, an authority by no means to be despised, relates that this king was led in the triumphal procession. (5) Following Scipio as he triumphed was Quintus Terentius Culleo wearing the liberty cap; and for all the rest of his life, as was fitting, he honoured in Scipio the giver of his freedom (trans. Moore).

Polybius 16.23: ... and when Scipio came into the city in triumph, and the actual sight of the prisoners who formed the procession brought still more clearly to their memories the dangers of the past, they became almost wild in the expression of their thanks to the gods, and their affection for the author of such a signal change. For among the prisoners who were led in the triumphal procession was Syphax, the king of the Masaesylii, who shortly afterwards died in prison. The triumph concluded, the citizens celebrated games and festivals for several days running with great splendour, Scipio, in his magnificent liberality, supplying the cost ... (trans. Shuckburgh)

Figure 2.49. Text reuse of preserved texts across languages (Livy cites Polybius)

Hyginus, *Astronomica* 2.40: Istros autem et complures dixerunt Coronida Phlegyae filiam fuisse, hanc autem ex Apolline Aesculapium procreasse, sed postea Ischyn Elati filium cum ea concubuisse. quod cum viderit corvus, Apollini nuntiasse; qui cum fuerit antea candidus, Apollinem pro incommodo nuntio eum nigrum fecisse et Ischyn sagittis confixisse.

Hyginus, *Astronomica* 2.40: Istros and several others have said that the Crow was Koronis, daughter of Phlegyas. She bore Aesculapius to Apollo, but after Ischys, son of Elatos, had lain with her, the crow, which had noted it, reported it to Apollo. For his unpleasant news Apollo changed him to black instead of his former white color, and transfixed Ischys with his arrows (trans. Jackson).

Figure 2.50. Text reuse of lost texts across languages (Hyginus cites Istros)

Translation of historical texts is an even more difficult task, because it is about texts produced in the past and problems of comprehension are much bigger than for modern and contemporary texts, and also because it is very difficult to agree on what we mean by translation and by *good* translation. This is one of the reasons why we still miss automatically generated translations of historical texts and experiments are at the very beginning.[156]

Tesserae has been implementing a Greek-Latin search, which is available online for testing results, and is producing a *translation dictionary* for linking Greek lemmata to associated Latin terms.[157] A similar method has been used as part of the *Digital Fragmenta Historicorum Graecorum* (DFHG) project in order to align the Greek text of the fragments with their Latin translation provided by the editor Karl Müller. This case is different from those mentioned before, because it is not about two ancient languages, but about the translation of ancient Greek into 19th century scholarly Latin. The method was based on the use of data from the *Dynamic Lexicon*, which is a project of the *Perseus Digital Library* for creating automatic bilingual dictionaries of Greek-English and Latin-English, using source

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156 Bamman/Crane (2009); Crane (2019).

157 https://tesseraev3.caset.buffalo.edu/cross.php

texts in Greek or Latin aligned with their English translations and using also morpho-syntactic data from Greek and Latin treebank.[158]

Another method has been explored by combining data of the *Dynamic Lexicon* with data of the *Ancient Greek WordNet* (AGWN), which is a project of the Institute for Computational Linguistics "A. Zampolli" in Pisa for producing a lexico-semantic resource mapped on Princeton WordNet 3.0.[159] Both approaches have produced translation pairs that are not completely correct because they still need accuracy improvement and manual validation, but they have shown that they can be integrated in order to improve performances. One of the problems that clearly emerges from these experiments is the lack of training data and the necessity of producing it in order to expand dictionaries of historical languages that can be used for increasing machine translation results.

Having this goal in mind, translation alignment tools have been developed in the last years, such as the translation alignment editor of the *Alpheios* project and *Ugarit iAligner* of the *Open Philology* project at the University of Leipzig. The first editor is part of a set of reading and learning environments developed by *Alpheios* to support worldwide study of classical languages and literatures. The tool has been experimentally used for research and teaching initiatives and as part of the *Perseids* project at Tufts University, allowing users to manually align two texts in two different languages including Greek, Latin, Aramaic, Egyptian, Persian, and Syriac.[160] *Ugarit iAligner* is a tool that performs automatic syntax-based intra-language alignment and automatic alignment of different versions of a text using a modified version of the *Needleman-Wunsch Algorithm.* It includes an editor for manual alignment of up to three languages.[161]

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158 Yousef/Berti (2015). First experiments on this method were carried out as part of a MSc dissertation written by Yousef (2015) under my supervision at the University of Leipzig. On the *Dynamic Lexicon*, see Bamman/Crane (2008a).

159 Berti/Bizzoni et al. (2016). On AGWN, see Bizzoni/Boschetti et al. (2014) and Boschetti/Del Gratta et al. (2016).

160 See, for example, Almas/Beaulieu (2016), Mernitz (2016), and Almas (2017). Teaching experiments have been also performed as part of the *Sunoikisis Digital Classics* program: Berti/Crane et al. (2015); Berti (2016b); Berti (2017b); Berti (2017c).

161 See http://ialigner.com, Yousef/Palladino (2017), and Yousef (2020). *Ugarit iAligner* is currently used at the University of Leipzig as part of the *Open Persian* project for aligning Persian poetry with modern languages and as part of the *Digital Rosetta Stone* project (section 4.6) for aligning the Hieroglyphic, Demotic, and Greek scripts of the inscription. See Berti/Jushaninowa et al. (2016), Foradi/Crane (2017), Berti/Naether/Amin et al. (2018b), Berti/Naether/Amin et al. (2018a), Berti/Naether/Bozia (2018).

3 Distributed Annotations of Fragmentary Texts

This chapter is devoted to distributed annotations of fragmentary texts in a digital environment. The first section (3.1) shows and explains the new idea of conceiving fragmentary texts as annotations of textual elements about reused authors and works. The second section (3.2) describes the *CITE Architecture*, which is a protocol for producing canonical citations, and its application to text reuse. The third section (3.3) describes an experiment developed by the *Perseus Project* for implementing a fragmentary texts editor.

3.1 Annotations of Reused Authors and Works

One of the main concerns when raising evidence of lost works is to reconstruct the complex relationship between the fragment and its source of transmission. This means weighing the level of interference played by the author who has reused and transformed the original context of the fragment — measuring the distance between the source text and the derived text — and trying to perceive the degree of text reuse and its effects on the resulting target text.[1] This interpretative process is usually explained in the commentary of an edition of fragmentary texts or in papers and monographs pertaining to various aspects of fragmentary authors and works, but is completely lost in the printed representation of the fragments, which are simply typographical reproductions of extracts of derived texts.[2]

As I described in section 2.2, textual fragments are a form of hypertext. In this respect, a digital environment offers the possibility to represent *fragments* as *text reuses* within their context of transmission, pointing directly to the elements that are traces of a text reuse and going beyond the problem of extracting and decontextualizing extended chunks of texts that preserve quotations and reuses of other texts.[3] A straightforward example is a quotation of the lost author Hecataeus of Miletus by Athenaeus of Naucratis in the *Deipnosphists*:

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1 Lee (2007) 472.
2 See section 1.4.
3 On the difficulty of defining borders and "boundaries of the open text" in a hypertext, which is a "borderless electronic text," see Landow (2006) 112–118.

> *Deipn.* 10.67 = 447c: Ἑκαταῖος δ᾽ ἐν δευτέρῳ Περιηγήσεως εἰπὼν
> περὶ Αἰγυπτίων ὡς ἀρτοφάγοι εἰσὶν ἐπιφέρει· τὰς κριθὰς ἐς τὸ πῶμα
> καταλέουσιν. ἐν δὲ τῇ τῆς Εὐρώπης Περιόδῳ Παίονάς φησι πίνειν
> βρῦτον ἀπὸ τῶν κριθῶν καὶ παραβίην ἀπὸ κέγχρου καὶ κονύζης·
> ἀλείφονται δέ, φησίν, ἐλαίῳ ἀπὸ γάλακτος. καὶ ταῦτα μὲν ταύτῃ.[4]

In this passage the Naucratites quotes two works of Hecataeus that are now lost
and adds a few pieces of information about the source texts: The name of the
fragmentary author (Ἑκαταῖος), the titles of two fragmentary works (Περιήγησις
and τῆς Εὐρώπης Περίοδος) with book number (δεύτερος) in the first case, and
different text reuses, which are introduced by *verba dicendi* (εἰπών, ἐπιφέρει, φησι
and φησίν) and seem to be partly paraphrases or summaries and partly *verbatim*
repetitions of the original words of the lost works. This passage is usually split
into two different chunks of text corresponding to two fragments of Hecataeus:
see FHG I 8 fr. 123 and 20 fr. 290; FGrHist 1 FF 154 and 323a; BNJ 1 FF 154 and
323a.

If the concept of hypertext is nowadays taken for granted and if the annota-
tions of the elements shown above seems to be an easy process, in fact a proper
representation of all the components belonging to the domain of historical text
reuse requires a complex infrastructure with layers of annotations and tagsets.[5]
These annotations include not only the portion of text that can be considered a
reuse, but also many pieces of information like names and geographic provenance
of reused authors with variants, titles and/or descriptions of reused works, *verba
dicendi*, expressions of literary criticism, and other linguistic and morphosyntac-
tic features.

Building a digital library of text reuses of fragmentary authors means, first
of all, to select the string of words that belong to the portion of text which is
classifiable as a reuse and, secondly, to encode all those elements that signal the
presence of the text reuse itself (named entities, grammar, syntax, etc.).

The next step is to align and encode all information pertaining to other wit-
nesses that reuse the same original text with different words and a different syn-
tax, parallel texts that deal with the same topic of the text reuse, and finally dif-
ferent editions and translations of both the source and the derived texts.[6]

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4   "Hecataeus in the Book II of the *Tour* reports that the Egyptians eat bread, and then contin-
ues: They grind up barley to produce the substance they drink. And in his *Journey through
Europe* he says that the Paeonians drink *brutos* made from barley, and *parabiē* made from
millet and fleabane; and they smear themselves, he claims, with oil made from milk. So
much for these topics." Trans. by Olson (2006–2012).

5   On the fast development of computing in the humanities in the last twenty years and on
the consequent implicit ingestion of the theory of hypertext, see Landow (2006) xi–xiv. For
an introduction to annotation and its literary, scholarly, civic, and everyday significance
across historical and contemporary contexts, see Kalir/Garcia (2021).

6   Almas/Berti (2013) 1; Berti/Romanello et al. (2009).

3.2 The CITE Architecture

Before addressing methods and strategies for annotating historical fragmentary texts, it is necessary to introduce the *CITE Architecture*, which is a framework for producing machine actionable citations of texts including quotations and text reuses of extant and lost sources. CITE is a digital library architecture that stands for "Collections, Indices, Texts, and Extensions."[7] This architecture was originally developed for the *Homer Multitext* (HMT), which is a project of the Harvard's Center for Hellenic Studies to digitally represent language, structure, and manuscript tradition of Greek epic poetry.[8] The goal of the architecture is to provide a framework for identifying and retrieving machine actionable *citations* of texts and other data that are the basis of scholarly publications in the humanities.[9] The architecture makes use of the international standard of "Uniform Resource Names" (URNs). This standard allows to make unique, complete, precise, and machine actionable scholarly citations. Given that URNs can be hierarchical, the architecture gives the possibility to cite at different levels of granularity.[10]

The architecture is based on two main *data models*: 1) the standard CTS URN for identifying and retrieving *texts* and *passages of texts*, and 2) the standard CITE URN for identifying and retrieving *discrete objects* and *other data* (e.g., manuscript folios, images, syntactic structure, metrical feet, text reuse, etc.).[11] The CTS URN is based on the assumption that a text can be modelled as "an ordered hierarchy of citation objects" (OHCO^2) and defines "a citable text as a set of citable nodes" that belong to a bibliographic hierarchy and to a citation hierarchy, and that are ordered.[12] Implementations of the CTS URN have been developed by different projects, such as the *Perseus Digital Library*, *Open Greek and Latin*, the *First 1000 Years of Greek*, the *Scaife Viewer*, the *Canonical Text Service* of the University of Leipzig and *CapiTainS*.[13] An example of a scholarly citation that can be digitally represented is "Homer, *Iliad*, edition of Wolf (1804), Book 1, line 1." This citation refers to the first line of the *Iliad* of Homer in the 1804 edition by Friedrich August

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7   http://cite-architecture.org
8   Dué/Ebbott (2009); Dué/Ebbott (2019).
9   Smith (2009).
10 Smith/Blackwell (2012); Blackwell/Smith (2016); Blackwell/Smith (2019).
11 CTS stands for "Canonical Text Services."
12 The acronym OHCO derives from DeRose/Durand et al. (1990), who argued that a text is an "ordered hierarchy of content objects." In Renear/Mylonas et al. (1996), the authors thought again their model and recognized that there are overlapping hierarchies when taking different perspectives on the content of a text. Smith/Weaver (2009) observed that a better functional definition of text has the "citation object" as its fundamental unit, and so proposed OHCO^2. CTS is built on this definition. See Smith/Blackwell (2012), Blackwell/Smith (2016) 3, and Berti/Blackwell et al. (2016) 124.
13 Crane/Almas et al. (2014); Tiepmar/Teichmann et al. (2014); Tiepmar (2018); Babeu (2019); Muellener (2019); Tiepmar/Heyer (2019).

Wolf and is valid both if a scholar reads a printed text of the book or a digital version of it in *Google Books*, *Internet Archive*, or *HathiTrust*:

Μῆνιν ἄειδε, θεά, Πηληϊάδεω Ἀχιλῆος,

According to the *CITE Architecture*, it is possible to convert this citation into a machine actionable format:

`urn:cts:greekLit:tlg0012.tlg001.wolf1:1.1`

This CTS URN represents different levels of the citation: The CTS *domain* (`urn:cts:`) which is required in the URN syntax, the *namespace* `greekLit` that identifies works in ancient Greek, and a *hierarchy* that identifies the work and the edition of the work. In this case the hierarchy is analogous to that of the *Functional Requirements for Bibliographic Records* (FRBR).[14] Within this hierarchy, texts exist in a text-group (in this case the Homeric poetry) and a text-group contains one or more works (in this case the *Iliad*). Identifiers include numbers of the *Thesaurus Linguae Graecae* (TLG), where Homer is `tlg0012` and the *Iliad* is `tlg001`.[15] `wolf1` is a reference to the 1804 edition of the *Iliad* by the German scholar Friedrich August Wolf. After the colon, `1.1` refers to book 1, line 1. It is also possible to expand the citation to ranges of passages (e.g., `1.1-1.2`) and add a substring to cite a word of the text (e.g., `1.1@μῆνιν[1]`).

`urn:cts:greekLit:tlg0012.tlg001` is the *work-level* identifier, where the *Iliad* is considered as an abstraction (notional work) that includes every edition and translation of the work.

`urn:cts:greekLit:tlg0012.tlg001.wolf1` is the "version-level" identifier (in this case the 1804 printed edition of the *Iliad* by Wolf).

`urn:cts:greekLit:tlg0012.tlg001.wolf1:1.1@μῆνιν[1]` is the passage component that also points to words (in this case the first occurrence of the string μῆνιν in book 1, line 1 of the edition of the *Iliad* by Wolf).

The CITE component of the architecture allows to identify and retrieve citations of discrete objects and other data like physical manuscript folios of the *Homer Multitext* project.[16] For example, `urn:cite:hmt:msA.msA–12r` uniquely identifies a single object in the *Homer Multitext* collection, which is folio 12 *recto* of the *Venetus A* manuscript. The *CITE Architecture* offers also the possibility to cite other data, such as lexical tokens, metrical feet, syntax, and fragmentary texts.[17] As I described in chapter 1, there are two main kinds of fragmentary texts: *fragmentary texts of still extant works* and *fragmentary texts of lost works*. The first kind of fragmentary text is citable as an alignment of CTS URNs. Following the examples described in chapter 1 (p. 10), the reuse of a passage of the *Histories*

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14 For the use of FRBR in the *Perseus Catalog*, see p. 26.
15 On TLG numbers of authors and works, see p. 19 n. 55.
16 Smith/Blackwell (2012).
17 Berti/Blackwell et al. (2016); Blackwell/Smith (2016); Blackwell/Smith (2019); Blackwell/Smith (2020).

of Herodotus (6.127.1) in the *Deipnosophists* of Athenaeus (12.58 = 541bc) can be documented as:

```
urn:cts:greekLit:tlg0008.tlg001:12.58@ἀπὸ[1]-12.58@ἀφίκετο[1]
```
quotes
```
urn:cts:greekLit:tlg0016.tlg002:6.127.1@ἀπὸ[1]-6.127.1@ἀπίκετο[1]
```

This alignment means that the string ἀπὸ μὲν Ἰταλίης Σμινδυρίδης ὁ Ἱπποκρά-τεος Συβαρίτης, ὃς ἐπὶ πλεῖστον δὴ χλιδῆς εἷς ἀνὴρ ἀφίκετο of Ath., *Deipn.* 12.58 is a *quotation* of the string ἀπὸ μὲν δὴ Ἰταλίης ἦλθε Σμινδυρίδης ὁ Ἱπποκράτεος Συβαρίτης, ὃς ἐπὶ πλεῖστον δὴ χλιδῆς εἷς ἀνὴρ ἀπίκετο of Hdt. 6.127.1.[18]

The second kind of fragmentary text (*lost text*) is citable as an alignment of CTS and CITE URNs. For example, Ath., *Deipn.* 3.6 (= 74e) is the only citable evidence of a passage of the work of Istros the Callimachean that is now lost: Ἴστρος δ᾽ ἐν τοῖς Ἀττικοῖς οὐδ᾽ ἐξάγεσθαί φησι τῆς Ἀττικῆς τὰς ἀπ᾽ αὐτῶν γινομένας ἰσχάδας, ἵνα μόνοι ἀπολαύοιεν οἱ κατοικοῦντες· καὶ ἐπεὶ πολλοὶ ἐνεφανίζοντο διακλέπτοντες, οἱ τούτους μηνύοντες τοῖς δικασταῖς ἐκλήθησαν τότε πρῶτον συ-κοφάνται.[19] In this case the text of the *Deipnosophists* can't be aligned with any other texts because the original work of Istros is lost. Moreover, in order to avoid the duplication of the text of Athenaeus by extracting from it the chunk of text with the reuse of Istros (as it happens in printed collections of fragmentary texts), the *CITE Architecture* offers the possibility to represent the reuse within the text of Athenaeus:

```
urn:cite:lofts:berti.istros12
```
quotes
```
urn:cts:greekLit:tlg0008.tlg001:3.6@Ιστρος[1]-3.6@συκοφάνται[1]
```

This alignment means that a passage of Ath., *Deipn.* 3.6 has been *quoted* and classified as fragment 12 (`istros12`) of Istros the Callimachean in the critical edition of the scholar Berti.[20] The CITE URN represents the level of the *edition*, while the CTS URN represents a string of *text* that is cited for specific purposes. The *CITE Architecture* allows different editors to cite and classify strings of text in different ways. For example, the same or a shorter or longer string of text referring to Istros in Ath., *Deipn.* 3.6 could be cited and classified by different editors and with different numbers in different editions of the fragmentary author Istros.

CITE URNs can be used for many other kinds of *citable analyses* within the domain of fragmentary literature. In this case the *data model* developed by the

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18   On the use of the Kaibel reference system in the CTS URNs of the *Deipnosphists*, see section 5.4.

19   "Istrus in his *Attic History* says that the dried figs produced by these trees were not exported from Attica, in order that only the inhabitants of the country could enjoy them. When many people were found to be evading the law, those who informed the jurors about them were then for the first time referred to as sycophants." Trans. by Olson (2006–2012).

20   Berti (2009b) 99–102.

CITE Architecture has been experimented with the *Deipnosophists* of Athenaeus of Naucratis and specifies five *subjects of analyses* with *properties*:[21]

1. **Authors** (properties)
   - *EntityUrn*: a CITE URN that uniquely identifies a reused author. An example is `urn:cite:digAth:authors.auth3` that identifies "Archilochus" and is unique for all occurrences of his name in the *Deipnosophists*.[22]
   - *CtsUrn*: a CTS URN that identifies a passage where the author is mentioned. `urn:cts:greekLit:tlg0008.tlg001:1.2@Ἀρχίλοχον[1]` is one of the passages of the *Deipnosophists* where Archilochus is mentioned. This passage serves to justify the author's inclusion in the list.[23] When an author is reused often, the passage here should be a clear, unambiguous reference (e.g., "Homer says [...]").
   - *Label*: a human-readable name for the author. E.g., "Archilochus of Paros."
   - *OptionalCtsGroupUrn*: a group-level CTS URN that identifies still extant authors. E.g., `urn:cts:greekLit:tlg0012:` (Homer).

2. **Works** (properties)
   - *EntityUrn*: a CITE URN that uniquely identifies a reused work. For example, `urn:cite:digAth:works.work1` identifies the gastronomic work by Archestratus of Syracuse or Gela.[24]
   - *AuthorUrn*: a CITE URN that uniquely identifies a reused author and corresponds to an author cataloged in **Authors**. `urn:cite:digAth:authors.auth20` identifies Archestratus of Syracuse or Gela, who was the author of a gastronomic work. Athenaeus writes that Archestratus was from Syracuse

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21 The *Deipnosophists* is a work full of many different kinds of quotations and reuses of other texts and this is the reason why it fits well with experiments for producing annotations of fragmentary texts in their context. On the *Digital Athenaeus* project and on the content of the *Deipnosophists*, see chapter 5. The *data model* of the *CITE Architecture* has been developed in collaboration with D. Neel Smith and Christopher W. Blackwell and was presented at the international conference *Digital Humanities 2016*: see Berti/Daniels et al. (2016) and Berti/Blackwell et al. (2016) (texts and examples mentioned in the following pages are taken from these papers).

22 In the syntax of the CITE URN, `auth3` represents a sequence number in an *ordered collection*. Each item has a sequence number that reflects the item's sequence in the text of the *Deipnosophists*. This value is programmatically generated by a CTS-aware script before publication of the collection: Berti/Blackwell et al. (2016). Given that text reuses in the same text can be identified and cited in different ways by different scholars, sequence numbers may differ in different *collections*. Examples provided here do not correspond to a complete analysis of the *Deipnosophists*, but to a first theoretical experiment with the text of Athenaeus.

23 This example is interesting because the citation of Archilochus is part of a passage of the *Deipnosophists* that mentions "Archilochus' successors" (τῶν μετ᾽ Ἀρχίλοχον ποιητῶν) and therefore includes two references: one to Archilochus and the other to the poets who came after him. The *CITE Architecture* allows to represent both references with different *citable analyses* of the same text.

24 For the syntax of the CITE URN that includes a sequence number for the items in the collection, see n. 22.

or Gela (Ἀρχέστρατος ὁ Συρακούσιος ἢ Γελῷος). Like for ancient titles (see n. 26), also places of origin of ancient authors are often uncertain and sources reflect these uncertainties. The *CITE Architecture* allows to cite the two traditions about the ethnic origin of Archestratus by generating two *citable analyses* that can be aligned to the same CITE URN that identifies the author (see below the *subject* **Mentions**). In this case the *EntityURN* `urn:cite:digAth:authors.auth20` will correspond to the *CtsUrn* `urn:cts:greekLit:tlg0008.tlg001:1.7@Ἀρχέστρατος[1]-1.7@Γελῷος[1]`, whose textual content corresponds to both Ἀρχέστρατος ὁ Συρακούσιος and Ἀρχέστρατος ὁ Γελῷος.[25]

- *CtsUrn*: a CTS URN that identifies a passage in Athenaeus where the work is mentioned. E.g., `urn:cts:greekLit:tlg0008.tlg001:1.7@ὅτι[1]-1.7@φησί[1]` identifies the passage of the *Deipnosophists* where the gastronomic work of Archestratus is mentioned.[26] This passage serves to justify the work's inclusion in the list. When a work is reused often, the passage here should be a clear, unambiguous reference (e.g., "Eupolis says, in the *Demoi* [...]").
- *Label*: a human-readable name for the work. E.g., "*Demoi.*"
- *OptionalCtsWorkUrn*: a work-level CTS URN that identifies still extant works. E.g., `urn:cts:greekLit:tlg0012.tlg001:` (*Iliad*).[27]

3. **Characters** (properties)
   - *EntityUrn*: a CITE URN that uniquely identifies sophists (characters) who take part in the banquet described by Athenaeus in the *Deipnosophists*.[28] For example, `urn:cite:digAth:characters:character1` identifies Aemilianus Maurus.
   - *CtsUrn*: a CTS URN that identifies a passage in Athenaeus where the character is mentioned. `urn:cts:greekLit:tlg0008.tlg001:3.25@Αἰμιλιανὸς[1]` is an example of one of the passages of the *Deipnosophists* where Aemilianus is mentioned and talks. This passage serves to justify the character's inclusion in the list; when a character is reused often, the passage here should be a clear, unambiguous reference (e.g., "Ulpianus says [...]").
   - *Label*: a human-readable name for the character. E.g., "Aemilianus Maurus."
   - *OptionalCtsGroupUrn*: for characters who were authors and whose texts are

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25 For the annotation of this example with INCEpTION, see section 5.6.3.
26 The work of Archestratus is one of the many examples of ancient Greek literature with different titles in the tradition. In the passage of the *Deipnosophists* cited here (1.7 = 4e) Athenaeus testifies that this work was entitled *Gastronomy* (Γαστρονομία) according to Chrysippus, *Life of pleasure* (Ἡδυπάθεια) according to Lynceus and Callimachus, *Science of dining* (Δειπνολογία) according to Clearchus, and *Art of cooking* (Ὀψοποιία) according to others. The *CITE Architecture* allows to cite all these four titles and align them to a unique identifier that represents them, because they are different expressions of the same work.
27 An interesting example are names for specific books of the *Iliad*, which can have more precise CTS URNs in the *OptionalCtsWorkUrn* field: e.g., `urn:cts:greekLit:tlg0012.tlg001:18` = *Making of arms* (Ὁπλοποιία), which is the name of the eighteenth book of the *Iliad*.
28 This is a specific *subject of analysis* for the *Deipnosophists*, where the author describes a group of twenty-two learned men (sophists) who take part in the banquet described in the book and who cite many texts of ancient literature: see section 5.5.3.

still extant, a group-level CTS URN that identifies the character. For example, `urn:cts:greekLit:tlg0057:` (Galenus of Pergamum).

4. **Mentions** (properties)
   – *EntityUrn*: a CITE URN that uniquely identifies a reference in the text of the *Deipnosophists* of Athenaeus. E.g., `urn:cite:digAth:mentions.1` identifies Archestratus of Syracuse.[29]
   – *CiteUrn*: a CITE URN (from **Authors** or **Works** above) that identifies the author or work mentioned in Athenaeus. `urn:cite:digAth:authors.auth20` identifies Archestratus in the list of **Authors**.[30]
   – *CtsUrn*: a CTS URN that specifies a passage in Athenaeus that mentions the author like `urn:cts:greekLit:tlg0008.tlg001:1.7@Ἀρχέστρατος[1]–1.7@Γελῶος[1]`.[31]
   – *Text*: the relevant textual content of the passage specified by the CTS URN (above). E.g., Ἀρχέστρατος ὁ Συρακούσιος.
   – *Notes*: human-readable notes. May be empty.

5. **Reuses** (properties)
   – *EntityUrn*: a CITE URN that uniquely identifies an instance of text reuse in the *Deipnosophists* of Athenaeus. For example, `urn:cite:digAth:reuse.1` identifies a reuse of a lost verse of Eratosthenes of Cyrene.
   – *CiteUrn*: a CITE URN (from **Authors** or **Works** above) that identifies the author or work mentioned in Athenaeus. `urn:cite:digAth:authors.auth13` identifies Eratosthenes of Cyrene.[32]
   – *CtsUrn*: a CTS URN that specifies a passage in Athenaeus containing the text reuse. This should be a range that includes language marking the passage as text reuse (*verbum dicendi*, etc.). E.g., `urn:cts:greekLit:tlg0008.tlg001:1.3@τρὶς[1]–1.3@ἄμεινον[1]` is the passage with the verse of Eratosthenes.[33]
   – *TextContent*: a string that contains the precise textual content (from Athenaeus) that is reused; this will exclude *verba dicendi*, etc. For example,

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29 As we have seen before, Archestratus has two possible places of origin and the *CITE Architecture* cites both. In this case another CITE URN refers to the possible origin of Archestratus from Gela (`urn:cite:digAth:mentions.2`). Both CITE URNs (**Mentions**) correspond to `urn:cite:digAth:authors.auth20` (**Authors**): see below.

30 Archestratus' work is transmitted with four different titles and therefore there are four different CITE URNs for **Mentions**: `urn:cite:digAth:mentions.3` (Γαστρονομία), `urn:cite:digAth:mentions.4` (Ἡδυπάθεία), `urn:cite:digAth:mentions.5` (Δειπνολογία) and `urn:cite:digAth:mentions.6` (Ὀψοποιία). All these CITE URNs correspond to `urn:cite:digAth:works.work1` (**Works**).

31 This passage refers to Archestratus with his two possible places of origin and the CTS URN is valid for both `urn:cite:digAth:mentions.1` (Ἀρχέστρατος ὁ Συρακούσιος) and `urn:cite:digAth:mentions.2` (Ἀρχέστρατος ὁ Γελῶος).

32 In this case the text of the *Deipnosophists* doesn't mention the name of Eratosthenes, but the expression "the Cyrenean poet" (ὁ Κυρηναῖος ποιητής) that has to be referred to Eratosthenes (cf. *Suda* [E 2898] s.v. Ἐρατοσθένης).

33 Fr. 30, p. 65 Powell.

"τρὶς δ' ἀπομαξαμένοισι θεοὶ διδόασιν ἄμεινον" is the verse of Eratosthenes.

– *Analytical Edition URN* [may be empty; only for extant works]: a CTS URN that attaches the reused text (from Athenaeus) to the ordered, hierarchical citation scheme of the reused work. Where Athenaeus reuses text from extant works, which exist in other editions with citation schemes, we can produce an Analytical Edition of that work, the "Athenaeus Edition"; this edition can be cited by CTS URNs. For lost works, there is no citation scheme, nor any inherent order to the text. For these, we will produce a collection of text reuses. This Collection can be cited by CITE URNs.

– *Alignment URN* [may be empty; only for extant works]: a CTS URN that specifies text in another edition of the reused work, used to assert an explicit alignment between Athenaeus' language and the language of another text. For example, the use of βουλεύεσθαι at Ath., *Deipn.* 1.18 can be interpreted as an allusion to βουληφόρε at *Iliad* 20.83; this is not a literal string match, nor are the two instances of the same lexical entity; we are asserting an alignment that is not discoverable by any automated process; the alignment urn allows us to make this alignment explicit.

– *Commentary* [may be empty]: a commenary that explains the interpretation of the text reuse.

– *Resp.*: The editor responsible for asserting the existence of, and documenting, this instance of text reuse.

Further experiments with this *data model* have been performed for annotating reuses of Homeric poetry in the *Deipnosophists* of Athenaeus with examples from the *Iliad*, which means working with reuses of a still extant work.[34] In this case the data model developed by the *CITE Architecture* specifies six pieces of information (*records*) to document text reuse:[35]

1. **Analysis Record URN**. Every documented instance of text reuse has a CITE URN, that uniquely identifies this instance in a CITE collection. E.g., `urn:cite:opdata:ahri:100` (item 100 in the `ahri` collection [Athenaeus' Homeric Reuse: *Iliad*], in the `opdata` namespace [open philology data]).

2. **Sequence Number**. The collection of instances of Homeric text reuse is an ordered collection; each item has a sequence number, reflecting the item's sequence in the text of the *Deipnosophists*. This value is programmatically generated by a CTS-aware script before publication of the collection.

3. **Analysed Text URN**. A CTS URN that indentifies (as precisely or imprecisely as necessary) the span of text in the *Deipnosophists* that is the subject

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34 As part of these experiments, citable analyses of text reuse of Homer's *Iliad* in the *Deipnosophists* were collected by Ellie Daniel, Kimbell Dobbins, and Samantha Strickland from Furman University during their internship at the University of Leipzig in the Summer 2015 under the supervision of Christopher W. Blackwell and myself.

35 A detailed description of the data model with examples is available in Berti/Blackwell et al. (2016) 126–127, from which are taken the texts and the example mentioned in the following pages.

of this analysis of text reuse. The scope of the *Analysed Text* is determined by the nature of the text reuse.

4. **Reused Text**. While the *Analysed Text URN* (above) identifies a coherent and contiguous span of text, as it appears in the Edition being analysed, the *Reused Text* is a string that identifies only the text being reused. The *Analysed Text URN* provides context and a basis for alignment, while the *Reused Text* gives us the flexibility to call out non-contiguous text, to normalize text, or even to promote morphological forms determined by indirect statement to those appropriate for direct speech, without doing violence to our source-Edition.

5. **Alignment URN**. This collection documents reuse of Homeric poetry, for which there are extant editions with canonical citation. The *Alignment URN* is a CTS URN that points to one specific edition of the *Iliad* that (a) justifies the claim of text reuse, and (b) is the basis for attaching an Iliadic citation to this analysis. The *Perseus* edition of the *Iliad* of Homer (`urn:cts:greekLit:tlg0012.tlg001.perseus-grc:`) is used for the Alignment URNs (edition by Thomas W. Allen).

6. **Analytical Edition URN**. The collected instances of Iliadic text reuse in the *Deipnosophists* represent a new edition of the *Iliad*, whose text-content is based on the analysis of the project's edition of Athenaeus. The *Analytical Edition URN* is a CTS URN to an "Athenaeus Edition" of the *Iliad*; the citation-value is based on that of the alignment URN; the text-content of this edition is the reused text in Athenaeus. The *Analytical Edition* gives us an orthogonal view of the Homeric text reuse in Athenaeus; it allows us to navigate Athenaeus according to the OHCO^2 structure of the *Iliad*. We cite two notional editions in this field:

   – `urn:cts:greekLit:tlg0012.tlg001.ogl1:` is "Athenaeus' edition of the *Iliad*." We also cite, in at least one analysis,

   – `urn:cts:greekLit:tlg0012.tlg001.ogl2:` that is "Zenodotus' edition of the *Iliad*, according to Athenaeus." `ogl1` and `ogl2` are 1) an *Open Greek and Latin* edition of the "*Iliad* of Athenaeus," consisting of collected Iliadic language of the *Deipnosophists*, and 2) another *Open Greek and Latin* edition of the "*Iliad* of Zenodotus, according to Athenaeus," consisting of Iliadic language attributed to Zenodotus' edition in the *Deipnosophists*.[36]

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36 For the example with a reference to the ancient scholar Zenodotus, see Ath., *Deipn.* 1.21 (= 12e–f) and Berti/Blackwell et al. (2016) 134–136 (for a detailed description) and 127.

An example of this data model is a passage in the first book of the *Deipnosophists* (1.18 = 11a) where Athenaeus discusses how Homer equates drunkeness with madness:

> καὶ Ἀγαμέμνων δὲ λέγει που περὶ αὐτοῦ "ᴬἀλλ' ἐπεὶ ἀασάμην φρεσὶ λευγαλέῃσι πιθήσας |ᴮἢ οἴνῳ μεθύων, ἤ μ' ἔβλαψαν θεοὶ αὐτοί," εἰς τὴν αὐτὴν τιθεὶς πλάστιγγα τὴν μέθην τῇ μανία.[37]

The Homeric text under analysis is ἀλλ' [...] αὐτοί, but the "analysed text" begins from καὶ Ἀγαμέμνων [...] because the introductory clause is the signal that Athenaeus is quoting from Homer.[38] The two lines of Homer generate two different records in the text reuse data: (A) and (B).

A (ἀλλ' ἐπεὶ ἀασάμην φρεσὶ λευγαλέῃσι πιθήσας) is most straightforward because it is a direct quotation of Homer that matches established editions of the *Iliad.* It is possible to assign an *Analysis Record URN* and fill in the other data fields (fig. 3.1). The first line of poetry in this passage of Athenaeus is found *verbatim* in *Iliad* 9.119, when Agamemnon is expressing remorse for the quarrel with Achilles. This will be the 100th instance of text reuse in the collection of Iliadic text reuse in Athenaeus. This instance of reuse emerges when we analyse the passage that begins "And Agamemnon says, somewhere [...]." The specific reused text in the passage under analysis is ἀλλ' [...] πιθήσας. This instance aligns with 9.119 in the *Perseus* edition of the *Iliad.* In the "*Iliad* according to Athenaeus' *Deipnosophists*," we can identify this text as 9.119, following the canonical citation of the poem.

Instance	Field	Value
A	Analysis Record URN	`urn:cite:opdata:ahri:100`
A	Sequence	`100`
A	Analyzed Text URN	`urn:cts:greekLit:tlg0008.tlg001.berti:1.18@καὶ[17]-1.18@αὐτοί[1]`
A	Reused Text	ἀλλ' ἐπεὶ ἀασάμην φρεσὶ λευγαλέῃσι πιθήσας
A	Alignment URN	`urn:cts:greekLit:tlg0012.tlg001.perseus-grc1:9.119`
A	Analytical Edition URN	`urn:cts:greekLit:tlg0012.tlg001.ogl01:9.119`

Figure 3.1. Athen., *Deipn.* 1.18 (11a) – record (A)

B (ἢ οἴνῳ μεθύων, ἤ μ' ἔβλαψαν θεοὶ αὐτοί) is more complicated because Athenaeus is quoting a line that does not appear in any (other) edition of the *Iliad.* It will share some data values with (A), but differ in oth-

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37 "And Agamemnon says, somewhere, about himself, 'But since I acted foolishly, obeying my addled thoughts | either I was drunk with wine, or the gods themselves harmed me,' placing drunkeness on the same balance as insanity." Trans. Berti/Blackwell et al. (2016) 128.

38 `urn:cts:greekLit:tlg0008.tlg001.berti:1.18@καὶ[17]-1.18@αὐτοί[1]`. This urn refers to an ongoing digital version of the *Deipnosophists* that I have been working on (`berti`).

Instance	Field	Value
B	Analysis Record URN	`urn:cite:opdata:ahri:101`
B	Sequence	`101`
B	Analyzed Text URN	`urn:cts:greekLit:tlg0008.tlg001.berti:1.18@καὶ[17]-1.18@αὐτοί[1]`
B	Reused Text	ἢ οἴνῳ μεθύων ἤ μ᾽ ἔβλαψαν θεοὶ αὐτοί
B	Alignment URN	`urn:cts:greekLit:tlg0012.tlg001.perseus-grc1:9.119`
B	Analytical Edition URN	`urn:cts:greekLit:tlg0012.tlg001.ogl01:9.119a`

Figure 3.2. Athen., *Deipn.* 1.18 (11a) – record (B)

ers (fig. 3.2). In this editorial judgement, the dactylic hexameter text ἢ οἴνῳ μεθύων, ἤ μ᾽ ἔβλαψαν θεοὶ αὐτοί is an instance of Homeric text reuse. It is assigned its own Analysis Record URN. This finding is the result of the analysis of the text at `urn:cts:greekLit:tlg0008.tlg001.berti:1.18@καὶ[17]-1.18@αὐτοί[1]`. (B) shares the same *Analysed Text URN* as (A). The text of (B) is after that of (A) in the text of Athenaeus, so (B) has a *Sequence number* one higher than that of (A). The *Analysed Text* passage presents (A) and (B) as a natural sequence, rather than two quotations juxtaposed by Athenaeus. Because the Alignment URN locates (A) in the *Iliad*, and because the Analysed Text unites (A) and (B), it is possible to use `urn:cts:greekLit:tlg0012.tlg001.perseus-grc1:9.119` as the Alignment URN for (B) as well. However, in this "Athenaeus Edition" of the *Iliad*, (B) is an additional citeable passage, which is identified as 9.119a.

3.3 Perseids Fragmentary Texts Editor

To annotate quotations and text reuses of fragmentary authors in digital source texts experiments have been performed within *Perseids*, which "offers a free and open online environment to produce collaborative data-driven editions of ancient documents."[39]

The work was developed in 2012 and 2013 as part of a collaboration between the Alexander von Humboldt Chair of Digital Humanities at the University of Leipzig and the *Perseus Digital Library*. The result is a demo version of a *Fragmentary Texts Editor* (FTE) within *Perseids*, whose aim was to produce a pro-

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39   See http://www.perseids.org. The development of *Perseids* was inspired by the work of several pre-existing projects, such as the *Tufts Miscellany Collection* at Tisch Library at Tufts University, the *Homer Multitext* project, and *Papyri.info*. The *Son of SUDA OnLine* (SoSOL) application is at the core of *Perseids*. For more information, see Almas/Berti (2013), Berti/Almas et al. (2014–2015), Almas/Beaulieu (2016), Berti/Almas et al. (2016), and Almas (2017). From these publications derive texts and examples reproduced in this section.

totype of a dynamic representation of quotations and reuses of fragmentary texts to help scholars annotate information about fragmentary authors by providing a shared environment for multi-level annotations of text reuses of ancient works. The demo is available at http://pubs.perseids.org/berti_demo/src/index.html and the code at https://github.com/PerseusDL/lci-demo.[40]

Figure 3.3. *Perseids Fragmentary Texts Editor*: Istros F 12 Berti

The FTE demo uses methods of inline and stand-off markup to produce stable ways for identifying and annotating text reuse, including canonical citations, morpho-syntactic analyses, translation and text alignments. The FTE demo interface collects texts from the printed edition of the fragments of Istros the Callimachean that I published in Berti (2009b). In this section I focus on a passage of the *Deipnosophists* of Athenaeus (3.6 = 74e) that preserves a text reuse of Istros (F 12 Berti).[41] Figure 3.3 shows the interface of the FTE demo with different functions for visualizing fragmentary texts.[42] The left side of the demo is devoted to the source of the text reuse:

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40   Almas/Berti (2013); Berti/Almas (2013); Berti/Almas et al. (2014–2015); Berti/Almas et al. (2016).

41   Berti (2009b) 99–102.

42   http://pubs.perseids.org/berti_demo/src/berti_demo.html#urn:cite:perseus:lci.2.1

- **Source Text**. This tab shows the passage of the source preserving the reuse according to different editions. In this case the text of *Deipn.* 3.6 is presented in two tabs according to the two editions by Charles B. Gulick and Georg Kaibel. The interface provides CTS URNs of Edition 1[43] and of Edition 2,[44] and a function for visualizing the entire TEI XML file and the full text of the two editions in separate windows.[45] The "Show/Hide Quote" hyperlink allows to highlight and hide in both editions the passage with the reference to Istros, providing also the CTS URNs of the passage in the two editions of the source text with a substring corresponding to the highlighted range of text.[46] The portion of text highlighted in yellow corresponds to the chunk of text of *Deipn.* 3.6 classified as fragment 12 in Berti (2009b).[47]
- **Witnesses**. This tab is for representing other sources that preserve the same or a similar text reuse of a fragmentary text. In the example described here the tab is not active because there are no other witnesses for this fragment of Istros.[48]
- **Parallel**. This tab allows to visualize parallel sources of the fragment of Istros, which means other sources about the same topic.[49]

On the right side of the interface it is possible to visualize information about the fragment annotated in the source text on the left side:

- **Lost Content Item**. This tab provides a short summary of the content of the fragment with information about its editor. Given that this is a reuse of a lost text, the fragment is cited with a CITE URN: `urn:cite:perseus:lci.2.1`. In the syntax of the CITE URN, `lci` stands for *Lost Content Items*, which is the collection of text reuses of lost texts in the FTE demo. Number `2` identifies the fragment in the collection. On the use

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43 `urn:cts:greekLit:tlg0008.tlg001.perseus-grc1:3.6`
44 `urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:3.6`
45 This function is not anymore available in the demo. The goal of the interface was to include more than one edition of the same source text.
46 The CTS URN has a URL prefix in order to be part of a resolvable web address. In the CTS syntax the FTE demo still uses the symbol "#" instead of "@" for separating the subreference from the passage (e.g., `#Ιστρος1-συκοφάνται1`): see Almas/Berti (2013), n. 1.
47 The FTE was implemented to include more editions of the same fragment, which means representing different annotations of the same text reuse by different editors. For this function, cf. the *demo.fragmentarytexts.org* described in section 2.2.
48 Berti (2009b) 99. Berti Istros F4 in the FTE demo provides the text of *Suda* [Π 152] s.v. Παναθήναια as one of the "witnesses" of the fragment of Istros: https://pubs.perseids.org/berti_demo/src/index.html. In this case the fragment has another witness (Photius), but, being a demo, the FTE provides only the text of sources available in a digital format. Cf. Berti (2009b) 59.
49 In this case the two parallel sources in the FTE are Plut., *Sol.* 24.1 (whose text is visualized with its CTS URN) and *Suda* [Σ 1330] s.v. συκοφαντεῖν (with a link to the *Suda On Line* project). For other parallel sources of this fragment, see Berti (2009b) 99–102.

of CITE URNs for text reuses of lost sources, see section 3.2.

– **Translation**. This tab provides translations of the text of the fragment.[50]
– **Commentary**. This tab provides a commentary to the fragment. As for other annotations, the FTE demo was originally planned to include more commentaries about the same reuse and each of them was collected and identified in a *Perseus Collection of Commentaries on Lost Content Items.*[51]
– **Aligment**. This tab provides alignments of the text of the fragment with its witnesses and/or parallel texts.[52] Translation alignments in the demo were produced in the *Perseids* platform using the *Alpheios* Translation Alignment Editor.
– **Syntax**. This tab shows morpho-syntactic annotations of the text of the fragment. Text reuse works not only at a word level, but also at a syntactic one, because reusing a text means not only quoting and readapting words in a new context, but also reproducing syntactic features. In this case the goal is to produce annotations of text reuses with the *Alpheios* Treebank Editor in order to collect and detect different examples of syntactic reuses (e.g., reuse of different words with the same syntax and/or reuse of the same words with a different syntax).[53]
– **Links**. This tab provides links to printed editions of the source text and of the fragmentary author through available resources, as for example *Google Books* and *Internet Archive*, or by uploading PDF files in the FTE demo.[54]

The work behind the *Fragmentary Texts Editor* combines TEI XML files, the *Open Annotation Core* (OAC) data model, and the *CITE Architecture* to represent quotations and text reuses via *Resource Description Framework* (RDF) triples. All of the textual and data elements presented in the display are defined as OAC annotations made available to the display code in a JSON-LD data structure. The subject and object resources of these triples are resolved by Canonical Text and CITE Collection Services to the TEI XML and other source data in real time in order to produce new dynamic, data-driven representations of the aggregated information.[55]

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50 In this case there are the English translation of the passage of the *Deipnosophists* from the edition by Charles D. Yonge and the Italian translation of the fragment of Istros from Berti (2009b).
51 `urn:cite:perseus:lcicomm`
52 In this case the alignments are with the two parallel texts of Plut., *Sol.* 24.1 and *Suda* [Σ 1330] s.v. συκοφαντεῖν.
53 On syntactic text reuse detection and for a visualization of syntactic annotation of Istros F 12 Berti, see http://demo.fragmentarytexts.org/en/istros.html.
54 All source texts, translations, commentaries and lost content item descriptions are retrieved at display time via asynchronous requests to remote services: Almas/Berti (2013).
55 Almas/Berti (2013); Berti/Almas (2013); Berti/Almas et al. (2014–2015); Berti/Almas et al. (2016).

As I showed in section 3.2, a quotation of a still surviving text can be represented with a RDF triple: **[subject cts-urn-1]** *quotes* **[object cts-urn-2]**. For example, I represent the annotation of a quotation of Homer in Athenaeus as:

urn:cts:greekLit:tlg0008.tlg001:3.X.x

(Athen., *Deipn.* passage X.x)

quotes

urn:cts:tlg0012.tlg001:X.xx

(Hom., *Il.* passage X.xx)

When working with text reuses of lost works the situation is different, because the original text of the reused author is lost and we have just the text of the reusing author, which is the only citable evidence. For this reason, a *Perseus Collection of Lost Content Items* (urn:cite:perseus:lci) was created as part of the FTE. These LCIs are assigned CITE URNs as unique identifiers, and assigned descriptive properties, for example naming a specific text reuse of a lost author as it is represented in a modern edition because we don't have the original text of the lost author and we have to express the citation at an edition-level. In our example (Athen., *Deipn.* 3.6), the annotation triple is represented in the following way:

urn:cite:perseus:lci.2.1[56]

quotes

urn:cts:greekLit:tlg0008.tlg001:3.6#Ἴστρος[1]-συκοφάνται[1][57]

This triplet expresses the relation between an object in a CITE Collection (an edition of a fragment of Istros) and a passage of a text (the *Deipnosophists* of Athenaeus who quotes Istros).

Annotations, and the texts and entities that they annotate, are the primary data type behind the FTE demo. The demo combines the TEI XML (EpiDoc subset) in which the source texts are encoded, with the CTS and CITE data models for URN based text and data object identifiers, the CTS and CITE service APIs, and the OAC standard for serialization of annotations.[58] This application of standards and data enables to present a new dynamic data-driven display leveraging *Linked Open Data* and also to publish annotation data in a standard format to facilitate its reuse.

The use of the OAC model enables to express FTE annotations according to a defined and documented standard, increasing the feasibility of their reuse. Using the OAC data model, annotations are expressed as simple URI based triples,

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56   This is the CITE URN identifier for the *Perseus Collection Object* that represents the text reuse of Istros with a reference to the edition of Berti (2009b), where this portion of Athenaeus' text is reproduced and classified as Istros F12.

57   This is the CTS URN identifier for Athen., *Deipn.* 3.6 with the addition of substring reference for greater precision.

58   On the *Perseus* CTS API, see Almas/Berti (2013).

with a controlled vocabulary to identify the motivation for the annotation. According to OAC, an annotation "target" is the resource being annotated and the annotation "body" is the resource containing the contents of the annotation. The URIs used for annotation bodies and targets can resolve to anything from simple text strings and vocabulary terms, to complex morpho-syntactic annotations. OAC also supports many-to-many relationships between annotation targets and annotation bodies. This is particularly useful for text reuse annotations, where the text being reused (and/or the instance of its reuse) cannot be expressed by a single contiguous range of text and instead is surrounded by words which are not explicitly part of the reuse. In this case, we can use multiple CTS URN identifiers for the substrings within the passage, the set of which become the target and/or body of the annotation.

The primary set of annotations driving the demo links the passages from the extant source text to the lost content item. These annotations identify the URI of the extant source text in which a reuse occurs as the *target* of the annotation and the URI of the CITE object representing the lost content item as the *body* of the annotation. I use the OAC vocabulary term *classifying* to define the motivation for these annotations, as we are classifying the passage in the extant source text as an occurrence of text reuse. By contrast, my commentary annotations reference the URI for the lost content item itself as the annotation target, and the URI for the commentary as the annotation body. Translations of source texts reference the URIs for the source text passages as their targets, and the URIs of the translated passages as their bodies.

The OAC vocabulary term chosen for the motivation in this case is *linking*. I link additional supporting resources, including other witnesses, translation alignments and morpho-syntactic annotations in a similar manner. The OA model enables to serialize every annotation in its most simple form, as a link between one or more target items being annotated, and one or more bodies representing the contents of the annotation. OA also gives a standard vocabulary for categorizing the motivation for the annotations. URIs are used to specify both the target and the body of the annotation.

The OA data model was used both as the primary representation of an annotation, in cases where the annotations are created by linking two identifiers (such as a link between a passage in a text and an identifier for a named entity or event), and also as a serialization method for more complex annotations, where the annotation process involves the creation of complex documents as the annotation bodies which can be then referenced by their URI identifiers. In the latter case, a variety of standard formats was used for the actual annotation bodies, including the *Perseus Ancient Greek and Latin Treebank* schema for morpho-syntactic analyses, the *Alpheios* translation alignment schema for text alignments, Mark-

down Syntax for short textual commentaries, TEI XML for primary and secondary source texts.[59]

Using the JSON-LD syntax recommended by OAC allows to build a dynamic display interface in Javascript that navigates the JSON-LD data object and retrieves the datasets identified as the targets and bodies of the annotations at their addressable URIs. The demo code retrieves the resources that are identified by CTS and CITE URN enabled URIs (as served by the CTS and CITE services discussed above) asynchronously as the page loads and in response to user interaction with interface widgets, and uses XSLT stylesheets to transform the XML content of the resources returned to HTML for display. The non CTS and CITE enabled resources are served by various other web applications, presenting various formats of data, and, due to time constraints, the demo currently presents these resources as links which open the original resource in a new tab or window. The annotation that represents the assertion according to which a text at Athen., *Deipn.* 3.6 describes a reuse of a lost work of Istros identified by `urn:cite:perseus:lci.2`, serialized in OA using the JSON-LD format, might be formalized as follows:[60]

```
{
    "@context": "http://www.w3.org/ns/oa-context-20130208.json",
    "@id": "http://perseids.org/annotations/urn:cite:perseus:annsimp
.2.1",
    "@type": "oa:Annotation",
    "annotatedAt": "2013-03-05T07:57:00",
    "annotatedBy": {
        "@id": "http://data.perseus.org/sosol/users/Monica Berti",
        "@type": "foaf:Person",
        "name": "Monica Berti"
                    } ,
    "has Body": "http://data.perseus.org/collections/urn:cite:
perseus:lci.2",
    "has Target": "http://data.perseus.org/citations/urn:cts:
greekLit:tlg0008.tlg001.perseus-grc1:3.6@Ιστρος[1]-3.6@
συκοφάνται[1]",
    "oa:motivatedBy": "oa:linking"
}
```

The *Perseids* platform has at its core the *Son of SUDA OnLine* (SoSOL) application, which is a Ruby on Rails application originally developed by *Papyri.info* that serves as front end for a Git repository of documents, metadata, and annotations. It includes a workflow engine that enables documents and data of different types

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59 Berti/Almas et al. (2014–2015) 7.
60 Almas/Berti (2013).

to pass through flexible review and approval process.[61] The SoSOL application includes user interfaces for editing XML documents, metadata, and annotations (fig. 3.4).

Figure 3.4. *Perseids* XML editing environment

When developing features of *Perseids* to support these workflows, the focus was first and foremost on the data. Considering that technologies change in a rapid way and while including prototype representations of digital editions suitable for publication on the web, the first priority was to enable scholars to create data about the authors, texts and related commentaries, annotations, links, and translations in a way that encourages and facilitates their preservation and reuse.

The following core requirements were identified to meet this goal: the ability to represent the texts themselves, links between them, and annotations and commentaries on them, in semantically and structurally meaningful ways that adhere to well-accepted and documented standard formats; stable and resolvable identifiers for all relevant data points, including the lost authors and their works, the authors and extant texts that preserve quotations and text reuses of the lost works, different editions and translations of the lost and extant texts, named entities (e.g., persons, places, and events) mentioned within the texts, commentaries and annotations on the texts from ancient times through the present; the ability to group any of the data points into collections representing different contextual views of the data; the ability to accurately represent provenance information for data and workflows.

As part of the FTE demo project and in order to represent the workflow of a scholar who identifies and edits a text reuse of a lost work, an experiment was done by applying and extending the *Systematic Assertion Model* (SAM), which is

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61   Berti/Almas et al. (2014–2015) 3–4.

Figure 3.5. Complementary provenance models: text reuse workflow:
Almas/Berti et al. (2013)

Summary: A scholar wants to annotate what she thinks is a quotation or text re-use of a lost text attributed to Istros in an extant source text by Plutarch (a reference to the origin of the word 'sycophants' where Istros is not named). To substantiate her argument, the scholar must also identify corroborating material, including instances of Istros' text in other primary sources, in this example that of Athenaeus Deipn. 3.6 (who does name Istros as the source).

a framework developed at the University of Illinois for the description of provenance roles and agents essential to the identity of scientific data that accounts for the events and roles essential to the creation of text-like resources.[62]

The focus of many provenance models, such as the W3C PROV model, is on functional elements and processes of computational activities, while SAM supplies a detailed account of the particular ways symbol structures are used in scholarly data and discourse. The experiment was done by presentig an example text reuse scenario drawn from *Perseids*, demonstrating the use of a SAM-based RDF vocabulary extended to support textual research in the humanities, along with elements from PROV and the *Open Annotation* data model. This integrated account provides a rich, contextualized view of the encoding and use of data in humanities research (fig. 3.5).[63]

To test the extensions to the SAM framework, the project team modeled an example of a scholarly assertion of text reuse. In this use case, the scholar (Berti) identifies a section of text from Plutarch, *Solon* 24.1 that she believes was drawn from the lost work of Istros the Callimachean:[64]

> τῶν δὲ γινομένων διάθεσιν πρὸς ξένους ἐλαίου μόνον ἔδωκεν, ἄλλα
> δ᾽ ἐξάγειν ἐκώλυσε· καὶ κατὰ τῶν ἐξαγόντων ἀρὰς τὸν ἄρχοντα ποι-
> εῖσθαι προσέταξεν, ἢ ἐκτίνειν αὐτὸν ἑκατὸν δραχμὰς εἰς τὸ δημό-
> σιον. καὶ πρῶτος ἄξων ἐστὶν ὁ τοῦτον περιέχων τὸν νόμον. οὐκ ἂν
> οὖν τις ἡγήσαιτο παντελῶς ἀπιθάνους τοὺς λέγοντας ὅτι καὶ σύκων
> ἐξαγωγὴ τὸ παλαιὸν ἀπείρητο, καὶ τὸ φαίνειν ἐνδεικνύμενον τοὺς
> ἐξάγοντας κληθῆναι συκοφαντεῖν.

The scholar wants to create an annotation that connects Plutarch's text back to Istros. To substantiate this argument, she identifies corroborating material from another primary source, which is Athenaeus' reference to Istros in the *Deipnosophists* 3.6:[65]

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62 Wickett/Sacchi et al. (2013); Almas/Berti et al. (2013); Berti/Almas et al. (2014–2015) 7–9.
63 Almas/Berti et al. (2013); Berti/Almas et al. (2014–2015) 7–9.
64 "Of the products of the soil, he allowed oil only to be sold abroad, but forbade the exportation of others; and if any did so export, the archon was to pronounce curses upon them, or else himself pay a hundred drachmas into the public treasury. His first table is the one which contains this law. One cannot, therefore, wholly disbelieve those who say that the exportation of figs also was anciently forbidden, and that the one who showed up, or pointed out such exporters, was called a 'sycophant,' or fig-shower." Trans. Perrin (1914). See Berti (2009b) 99–102.
65 "Istrus in his *Attic History* says that the dried figs produced by these trees were not exported from Attica, in order that only the inhabitants of the country could enjoy them. When many people were found to be evading the law, those who informed the jurors about them were then for the first time referred to as sycophants." Trans. by Olson (2006–2012).

Ἴστρος δ᾽ ἐν τοῖς Ἀττικοῖς οὐδ᾽ ἐξάγεσθαί φησι τῆς Ἀττικῆς τὰς ἀπ᾽ αὐτῶν γινομένας ἰσχάδας, ἵνα μόνοι ἀπολαύοιεν οἱ κατοικοῦντες: καὶ ἐπεὶ πολλοὶ ἐνεφανίζοντο διακλέπτοντες, οἱ τούτους μηνύοντες τοῖς δικασταῖς ἐκλήθησαν τότε πρῶτον συκοφάνται.

This scenario could include references to other primary sources that directly quote, allude to, or paraphrase Istros or the consultation of additional resources, such as comparisons of syntactic analyses and translations, or scholarly commentaries.[66]

Figure 3.5 shows the workflow of this text reuse scenario: Scholar Berti [B] is the *agent* of an Indication [B1] — the selection of a string of text. [B1] *informs* an Activity [S1] by the system — a Computation [S2] of the URI for a text passage [P1] by Plutarch [P]. [B] makes an Assertion [B2], the *substance of* which is Propositional Content [B3] as *expressed by* an Annotation [B4] *targeting* the Plutarch text [P1] as a reuse of a Lost Content Item [l1] attributed to Istros the Callimachaen [l]. [B] *indicates* another string of text [B5] that *informs* an Activity [S3] by the system — a Computation [S4] of the URI for a text passage [A2] by Athenaeus [A]. The text at [A2] is the *primary expression* of an Assertion [A1], the *substance of* which is Propositional Content [A3] as *expressed by* an Annotation [A4] *targeting* [A2] as a reuse of Lost Content Item [l1] attributed to Istros. B's Assertion [B2] is *warranted by* A's ancient Assertion [A1].

Combining SAM entities and properties with those from other models, such as W3C's PROV and *Open Annotation* (OA), provides a richer, more contextualized view of data encoding and use in humanities research:

- **SAM Indication**. Event in which some abstract structures (e.g., a series of characters) are indicated in the pursuit of some intellectual or creative goal.
- **SAM Assertion**. Event in which an agent advances a claim. The primary expressive may be a natural language sentence or any abstract arrangement of symbols. Assertions that are warranted by observations or computations are *systematic assertions*.
- **SAM Prospositional Content**. Language-independent bearer of truth values.
- **SAM Computation**. An event that may reflect contingencies such as scholarly interpretation. Does not necessarily imply *creation*. E.g., an analytic process may indicate a string of text which already existed.
- **PROV Activity**. Event through which entities come into existence and/or change to become new entities. Activities are dynamic aspects of the world, such as actions, processes, etc.

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66 Berti (2009b) 99–102.

– **OA Annotation**. Expresses the relationship between two or more re-
sources, including metadata about the relationship concerning creation and
intent.

Combining complementary data provenance models enables to more precisely
track and document shared resources, ultimately improving data quality and en-
couraging further sharing. Using PROV Activities, it was possible to share precise
details about system actions and processes leading to the extraction of text and
creation of URI endpoints. SAM was used to identify the contingent aspect of
the underlying resources as things which are subject to interpretation and which
were in existence prior to their use as data in our analysis. OA was used to share
concrete serializations of the analyses in the form of annotations.[67] In this use
case the model enabled to (1) reference ancient data that can be identified but that
did not literally come into existence as the result of any modern computational
interaction (and which may in fact no longer be extant in any preserved source),
and (2) identify the role a data item, such as an ancient scholarly assertion, plays
as the vehicle for the modern scholarly claims. A third (3) requirement, which
results from the second, is that it was necessary to represent the assertions of the
ancient scholars, on which our modern assertions depend, in a format that can
be included computationally in a common data set with the modern claims.

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67   Almas/Berti et al. (2013).

4 Digital Fragmenta Historicorum Graecorum

> This chapter presents origin and characteristics of the *Digital Fragmenta Historicorum Graecorum* (DFHG) project, which is the dynamic and expanded version of the printed edition of the *Fragmenta Historicorum Graecorum* (FHG) that was originally edited by Karl Müller. The first section (4.1) describes the printed edition of the FHG. The second section (4.2) describes reasons and general characteristics of the DFHG project, while the third and fourth sections (4.3 and 4.4) describe in details its tools and add-ons. The two final sections present two projects about two documents included in the printed collection of the FHG with two fragmentary inscriptions: the *Digital Marmor Parium* project (4.5) and the *Digital Rosetta Stone* project (4.6).

4.1 The Fragmenta Historicorum Graecorum

The *Fragmenta Historicorum Graecorum* (FHG) is an edition of five volumes edited by Karl Müller with the help of his brother Theodor Müller and Victor Langlois. The work was printed in Paris between 1841 and 1873 by the publisher Ambroise Firmin Didot.[1]

This edition is the first big collection of ancient Greek historical fragments consisting of excerpts (*fragmenta*) from many different sources pertaining to 636 ancient Greek fragmentary historians. Authors cover a period of time from the 6th century BC through the 7th century CE and, excluding the first volume, are chronologically distributed in the collection. Fragments are numbered sequentially, arranged by works and book numbers if these pieces of information are available in the source text, and almost every Greek fragment is translated or

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1 Müller (1841–1873). On the role of the publisher Didot and on the philological, cultural, and political context of this enterprise, see Petitmengin (1983) and Grafton (1997). Karl Müller edited also the fragments of the minor Greek geographers, the fragments of the historians of Alexander the Great, and the fragments of Ctesias and of the chronographers: Müller (1855–1861), Dübner/Müller (1846), Dindorf/Müller (1858).

summarized into Latin.[2] The predecessor of the FHG is the collection planned by Creuzer (1806) (*Historicorum Graecorum Antiquissimorum Fragmenta*), who published the first part with the fragments of Hecataeus, Charon, and Xanthus, but didn't complete the project. Ctesias was published by Bähr (1824), Ephorus by Marx (1815), and Philistus and Timaeus by Göller (1818). Hellanicus, Pherecydes, and Acusilaus had already been published by Sturz (1787) and Sturz (1789).[3] Other collections of fragmentary historians included Philochorus by Lenz/Siebelis (1811), who also added the fragments of the *Atthis* of Androtion, the Atthidographers by Lenz/Siebelis (1812), Theopompus by Wichers (1829), and Phylarchus by Lucht (1836) and Brückner (1839). Surviving fragments of minor Greek historians were published by Dindorf (1870–1871).[4]

FHG I collects 19 fragmentary historians together with the *Bibliotheca* of Apollodorus and its fragments, the Parian Marble with Latin introduction, translation, and commentary by Karl Müller, and the Greek text of the Rosetta Stone with French introduction, translation, and commentary by Jean-Antoine Letronne:

Hecataeus	Philistus	Demo
Charon	Timaeus	Philochorus
Xanthus	Ephorus	Ister
Hellanicus	Theopompus	Apollodorus
Pherecydes	Phylarchus	Marmor Parium
Acusilaus	Clidemus	Marmor Rosettanum
Apollodorus Atheniensis	Phanodemus	
Antiochus	Androtio	

Fragmentary authors of this volume are dated between the 6th and the 2nd century BC. After a first part with the fragments of Hecataeus of Miletus, Charon of Lampsacus, Xanthus of Lydia, Hellanicus of Lesbos, Pherecydes, and Acusilaus of Argos, Müller adds a supplement with the *Bibliotheca* of Apollodorus, who is identified with the homonymous grammarian of Athens whose fragments of other works are printed at the end of the volume. After this section he adds the fragments of the historians of Sicily (Antiochus of Syracuse, Philistus of Syracuse, Timaeus of Tauromenius), of Ephorus, Theopompus, and Phylarchus, and finally of the Atthidographers (Clidemus, Phanodemus, Androtio, Demo, Philochorus, Ister): FHG I, i–vii. The Parian Marble and the Greek text of the Rosetta Stone were added in an appendix at the end of the volume for their importance as

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2   For a description of the printed layout of the FHG, see pp. 32 ff.

3   On the historiographical work of Creuzer, see Momigliano (1946).

4   For other bibliographic references to works on single fragmentary authors published before the collection of Karl Müller, see the prefaces to FHG volumes. On the forgotten work of Renaissance scholars, who anticipated the big collections of Greek historical fragments produced in modern Europe, see Dionisotti (1997) and Grafton (1997).

historical and philological documents: FHG I, vii. The chronicle preserved by the inscription of the so called *Marmor Parium* is a fragmentary work in the literal sense of the word. The *Marmor Rosettanum* was added with the French literal translation of the Greek text that Jean-Antoine Letronne produced at the request of Jean-François Champollion to help him with the analysis of the differences between the Egyptian and the Greek versions of the decree carved on the stone (FHG I, v–viii from the *avertissement* of the section with the *Marmor Rosettanum* at the end of the volume).[5]

FHG II–IV include a total of ten books (*libri*) corresponding to a chronological distribution of the authors (see figure 1.9). **FHG II** contains the first four books corresponding to different periods of time between 520 and 247 BC (FHG II, i–iv). The volume collects 95 fragmentary historians, who are preceded by a section with recently discovered *excerpta* of Diodorus Siculus, Polybius, and Dionysius of Halicarnassus (*de insidiis quae regibus structae sunt excerpta*):

Diodorus Siculus	Cratippus	Palaephatus Abydenus
Polybius Megalopolitanus	Aristippus Cyrenaeus	**Liber quartus**
Dionysius Halicarnassensis	Dionysius Tyrannus	Menecrates Elaita
Liber primus	Hermias Methymnaeus	Menecrates Xanthius
Cadmus Milesius	Athanas Syracusanus	Menecrates Olynthius
Dionysius Milesius	Timonides Leucadius	Menecrates Tyrius
Dionysius Mytilenaeus	Dionysodorus Boeotus	Menecrates Nysaensis
Dionysius Rhodius sive	Anaxis Boeotus	Andron Ephesius
Samius	Zoilus Amphipolita	Andron Tejus
Hippys Rheginus	Cephisodorus	Andron Halicarnassensis
Eugeon Samius	Demophilus	Andron Alexandrinus
Deiochus Proconnesius	Theocritus Chius	Diodorus Periegeta
Bion Proconnesius	Dino	Diyllus Atheniensis
Eudemus Parius	Heraclides Cumanus	Demetrius Phalereus
Democles Pygelensis	Aristagoras Milesius	Strato Lampsacenus
Amelesagoras Chalcedonius	**Liber tertius**	Theodectes Phaselita
Glaucus Rheginus	Aristoteles	Lycus Rheginus
Democritus Abderita	Dioscorides	Nymphodorus Syracusanus
Herodorus Heracleensis	Heraclides Ponticus	Callias Syracusanus
Simonides Ceus	Dicaearchus Messenius	Antander Syracusanus
Xenomedes Chius	Aristoxenus Tarentinus	Hecataeus Abderita
Ion Chius	Phanias Eresius	Pseudo-Hecataeus
Stesimbrotus Thasius	Clearchus Solensis	Amometus
Hippias Eleus	Leo Byzantius	Megasthenes
Damastes Sigeensis	Leo Alabandensis	Daimachus Plataeensis
Anaximander Milesius	Leo Pellaeus	Patrocles
Critias Atheniensis	Clytus Milesius	Demodamas Milesius
Liber secundus	Maeandrius Milesius (Leander Milesius)	Demodamas Halicarnassensis
Themistogenes Syracusanus	Antipater Macedo	Demochares Leuconoensis
Sophaenetus Stymphalius		

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5   On the Greek version of the Rosetta Stone, cf. Clarysse (1999).

Hieronymus Cardianus
Pyrrhus Epirota
Proxenus
Cineas Thessalus
Suidas

Duris Samius
Idomeneus Lampsacenus
Dionysius Heracleota
Berosus Chaldaeus
Manetho Sebennyta

Craterus Macedo
Persaeus Cittiensis
Demetrius Byzantius
Sosibius Laco
Ctesibius

FHG III collects 134 fragmentary historians distributed in other four books corresponding to different periods of time between 247 BC and 306 CE:

Liber quintus
Neanthes Cyzicenus. Lysimachus
Nymphis Heracleota
Philinus Agrigentinus
Euphantus Olynthius
Sphaerus Bosporanus
Aratus Sicyonius
Dinias Argivus
Dionysius Argivus
Philostephanus Cyrenaeus
Hermippus Callimachius
Callixenus Rhodius
Ptolemaeus Megalopolitanus
Hegesianax Alexandrinus e Troade
Mnesiptolemus
Euphorion Chalcidensis
Diocles Peparethius
Diocles Rhodius
Quintus Fabius Pictor
Numerius Fabius Pictor
L. Cincius Alimentus
P. Cornelius Scipio
C. Acilius Glabrio
Hannibal Carthaginiensis
Sosilus Lacedaemonius
Chaereas
Silenus Calactinus
Xenophon
Eumachus Neapolitanus
Menodotus Perinthius vel Samius
Alexandrides Delphus
Polemo Iliensis
Mnaseas Patrensis
Satyrus
Heraclides Lembus
Posidonius Olbiopolita
Strato
Aulus Postumius Albinus

Zeno Rhodius
Antisthenes Rhodius
Scylax Caryandensis
Liber sextus
Ptolemaeus Evergetes II
Dionysius Thrax
Agatharchides Cnidius
Agatharchides Samius
Psaon Plataeensis
Cnaeus Aufidius
Publius Rutilius Rufus
Promathidas Heracleota
Promathion
Metrodorus Scepsius
Cornelius Alexander Polyhistor
Alexander Ephesius
Posidonius Apamensis
Lucius Lucullus
Marcus Tullius Cicero
Titus Pomponius Atticus
Asclepiades Myrleanus
Asclepiades Tragilensis
Asclepiades Cyprius
Asclepiades Arei filius
Asclepiades Mendesius
Asclepiades Anazarbensis
Aristodemus Nysaensis
Aristodemus Eleus
Aristodemus Thebanus
Artavasdes Armeniae rex
Theophanes Mytilenaeus
Timagenes Alexandrinus
Aristo Alexandrinus
Socrates Rhodius
Olympus
Empylus Rhodius
Liber septimus
Caecilius Calactinus
Lysimachus Alexandrinus
Nicolaus Damascenus

Juba Mauritanus
Athenodorus Tarsensis
Dionysius Pergamenus
Diodorus Sardianus
Theodorus Gadarenus
Strabo Amasensis
Chaeremon Alexandrinus
Seleucus Alexandrinus
Thrasyllus Mendesius
Potamo Mytilenaeus
Apion Oasita
Thallus
Pamphila Epidauria
Claudius Caesar
Polyaenus Sardianus
Justus Tiberiensis
Hermogenes Tarsensis
Memnon
Liber octavus
Philo Byblius
Aspasius Byblius
Favorinus Arelatensis
Hadrianus Caesar
Arrianus Nicomedensis
Phlegon Trallianus
Cephalion
Nicanor Alexandrinus
Telephus Pergamenus
Pallas
Charax Pergamenus
Anonymus Milesius
Crepereius Calpurnianus
Pompeiopolitanus
Callimorphus Medicus
Anonymi
Anonymus Corinthius
Antiochianus
Anonymus
Demetrius Sagalassensis
Damophilus
Chryseros Nomenclator

Athenaeus Naucratita
Judas
Severus Imperator
Asinius Quadratus
Nicagoras Atheniensis
Lupercus Berytius
Callinicus Petraeus

Ephorus Cumanus
Nicostratus Trapezuntius
Nicomachus
Callicrates Tyrius
Theocles
Asclepiodotus
Zenobia

Dexippus Atheniensis
Arrianus
Porphyrius Tyrius
Eusebius
Onasimus
Claudius Eusthenes

FHG IV includes 362 fragmentary historians distributed in two books. The ninth book collects 18 authors dated between 306 and 602 CE, while the tenth book is a big collection of 344 authors whose chronology is uncertain. An appendix at the end of the volume contains the fragments of John of Antioch (FHG IV, i-iii):

Liber nonus
Praxagoras Atheniensis
Bemarchius Caesariensis
Eustochius Cappadox
Magnus Carrhenus. Eutychianus Cappadox
Eunapius Sardianus
Olympiodorus Thebaeus
Priscus Panites
Malchus Philadelphensis
Capito Lycius
Candidus Isaurus
Eustathius Epiphaniensis
Hesychius Milesius
Nonnosus
Petrus Patricius
Anonymus qui Dionis Cassii Historias continuavit
Menander Protector
Theophanes Byzantius
Joannes Epiphaniensis
Liber decimus
Abas
Abron vel Habron Batiensis
Abydenus
Acesander
Acestodorus vel Acestorides
Achaeus
Aeneas
Adaeus Mytilenaeus
Aenesidemus
Aethlius Samius
Agaclytus
Agathocles Cyzicenus vel Babylonius
Agathon Samius

Agathonymus
Agesilaus
Agias Argivus
Aglaosthenes
Agathosthenes
Agriopas
Agroetas
Alcetas
Alcimus Siculus
Alexarchus
Alexis Samius
Amphicrates Atheniensis
Amphilochus
Amphion Thespiensis
Anaxicrates
Anaxilaus
Andreas Panormitanus
Andriscus
Androetas Tenedius
Andronicus Alypius
Antenor
Antigonus
Antileo
Antilochus
Antimachus
Antiochus
Antipater
Apellas sive Apollas Ponticus
Aphrodisius vel Euphemius
Apollodorus Artemiten
Apollodorus Erythraeus
Apollonides Horapion
Apollonius Aphrodisiensis
Apollonius Ascalonita
Apollonius Acharnenses
Apollonius Rhodius

Apollothemis
Archemachus Euboeus
Aretades Cnidius
Aretes Dyrrachinus
Archinus
Architimus
Ariaethus Tegeata
Aristaenetus
Aristeas Argivus
Aristides Milesius
Aristippus
Aristo Pellaeus
Aristobulus
Aristocles
Aristocrates
Aristocreon
Aristocritus
Aristomenes
Aristonicus Tarentinus
Aristonymus
Aristophanes Boeotus
Armenidas
Artemidorus Ascalonita
Artemon Clazomenius
Artemon Pergamenus
Artemon Cassandrensis
Astynomus
Athanadas
Athenaeus
Athenicon
Athenocles
Athenodorus Eretriensis
Augeas
Autesion
Autocharis
Autocrates

Balager
Basilis
Baton Sinopensis
Bion Solensis
Botryas Myndius
Bruttius sive Brettius
Butorides
Caemaro
Callicrates
Callidemus
Calliphanes
Callippus Corinthius
Domitius Callistratus
Carystius Pergamenus
Cassander Salaminius
Cercidas Megalopolitanus
Charicles
Charon Naucratites
Chrestodemus
Christodorus
Chrysermus Corinthius
Chrysippus
Claudius Iolaus
Claudius Theon
Clodius Neapolitanus
Clemens
Cleobulus
Cleon Magnesius
Cleon Syracusanus
Clinias
Cleophanes
Cleophorus
Clitonymus
Clitophon Rhodius
Conon
Cosmes
Crates Atheniensis
Creon vel Paeon Amathusius
Creophylus
Critolaus
Criton Pieriota
Ctesicles
Ctesiphon
Ctesippus
Cydippus Mantinensis
Daes Colonensis
Dalion
Damon
Damocritus
Demades
Demagoras Samius

Demaratus
Demetrius Callatianus
Demetrius Erythraeus
Demetrius Iliensis
Demetrius Odessanus
Demetrius Salaminius
Democritus Ephesius
Demognetus
Demosthenes Bithynus
Demoteles
Dercylus Argivus
Dieuchidas
Dinarchus
Dion Academicus
Diogenes Cyzicenus
Diogenes Sicyonius
Dionysius Chalcidensis
Diophantus
Diophantus Lacedaemonius
Aelius Dius
Dosiades
Dositheus
Draco
Echemenes
Echephylidas
Empodus
Epaphus
Eparchides
Epimenides
Ergias Rhodius
Erxias
Euagoras Lindius
Eualces
Euanoridas Eleus
Eucrates
Eudoxus Rhodius
Euemeridas Cnidius
Euelpis Carystius
Euthymenes
Glaucippus
Glaucus
Gorgias Atheniensis
Gorgon
Harmodius Lepreates
Aelius Harpocration
Hegemon Alexandrensis
Hegesander Delphus
Hegesander Salaminius
Hegesidemus Cythnius
Hegesippus Mecybernaeus
Heliodorus Atheniensis

Heraclitus Lesbius
Hereas
Hermaeus (Hermeas)
Hermesianax Cyprius
Hermesianax Colophonius
Heron Atheniensis
Heropythus
Hicesius
Hiero
Hierocles
Hippagoras
Hippasus Lacedaemonius
Hippias Erythraeus
Hippostratus
Histiaeus
Hypermenes
Hyperochus Cumanus
Hypsicrates
Isigonus Nicaeensis
Laetus
Lamiscus Samius
Laosthenidas
Leocrines
(Leonides)
Linus Oechaliensis
Lepidus
Lucillus Tarrhaeus
Lyceas Naucratita
Lysanias Mallotes
Macareus
Malacus
Marcellus
Megacles (Megaclides)
Melanthius
Melanthius Pictor
Melisseus
Melito
Menander Ephesius
Menecles Barcaeus
Menelaus Anaeus
Menesthenes
Menetor
Menippus
Menyllus
Metrophanes
Mnesimachus
Mnasigiton
Molpis Laco
Monimus
Myronianus Amastrianus
Myes

Myrsilus Methymnaeus
Myron Prienensis
Nicander Chalcedonius
Nicander Alexandrinus
Nicander Thyatirenus
Nicias
Nicias Maleotes
Nicias Nicaeensis
Nicocles Lacedaemonius
Nicomachus
Nicomedes Acanthius
Nicocrates
Nicostratus
Olympichus
Pamphilus
Pappus
Parthax
Pasiteles
Pausanias Laco
Pausanias Damascenus
Pausimachus Samius
(Paxamus)
Petellides Cnossius
Phaestus
Phanocritus
Phanodicus
Pharnuchus Nisibenus
(Philalius Corinthius)
Philemon
Philetas Ephesius
Philippus Theangelensis
Phillis Delius
Philistides
Philistus Naucratita
Philocrates
Philomnestus

Philonides. Philogenes
Philteas
Pisistratus Liparaeus
Polyanthus Cyrenaeus
Polycharmus (Naucratita)
Polycrates
Polygnostus sive Polygnotus
Polyzelus Rhodius
Posidippus
Possis Magnesius
Praxion
Procles Carthaginiensis
Protagorides Cyzicenus
Protarchus Trallianus
Ptolemaeus Mendesius
Pyrrhander
Pyrgion
Pyrrho Liparaeus
Pythaenetus
Pythagoras
Pythermus Ephesius
Pythocles Samius
Scamon Mytilenaeus
Scythinus Teius
Seleucus Emesenus
Semeronius Babylonius
Semus Delius
Socrates Argivus
Socrates Cous
Sosander
Sosicrates
Sosicrates Rhodius
Sosthenes Cnidius
Sostratus
Staphylus Naucratita
Stesiclides Atheniensis

Telephanes
Telesarchus
Teucer Cyzicenus
Teupalus Andriensis
Theagenes (Macedo)
Themiso
Themistagoras Ephesius
Theocles
Theodori
Theodorus Rhodius
Theodorus Hierapolita
Theodorus Samothrax
Theodorus Iliensis
Theognis
Theolytus (Methymnaeus)
Theophilus
Theotimus
Theseus
Timagetus
Timagoras
Timolaus
Timomachus
Timonax
Timotheus
Uranius
Xenagoras
Xenion
Xenocrates
Xenophilus
Zenis
Zenodotus Troezenius
Zopyrion
Zopyrus Byzantius
Appendix ad librum nonum
Joannes Antiochenus

FHG V is divided into two parts. The first part (*pars prior*) includes 9 authors whose *excerpta* were extracted from recently discovered manuscripts:[6]

Aristodemus
Eusebius
Priscus

Joannes Antiochenus
Joannes Malala
Critobulus

Photius
Anonymus
Dionysius Byzantius

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6   FHG V *pars prior* v–vi (*praefatio*), vii–lv (*prolegomena*), and lvi–lxxi (*addenda*).

The second part (*pars altera*) was edited by Victor Langlois and includes French translations and commentaries of texts and fragments of 11 Greek and Syrian authors whose works were translated and preserved in Armenian sources (*historiens grecs traduit en arménien; historiens syriens traduit en arménien; fragments d'historiens grecs perdu, conservés dans les œuvres des historiens arméniens*):[7]

Première partie	Léroubna d'Édesse	Grégoire Magistros duc de la
Mar Apas Catina	Zénob de Glag	Mésopotamie
Bardesane	Jean Mamigonien	Saint Épiphane évêque de
Agathange	**Appendice**	Salamine en Chypre
Faustus de Byzance	Moïse de Korhène	
Seconde partie	Le Pseudo-Callisthènes	

Every volume of the FHG has a *praefatio* (except for volume III), an *index nominum et rerum*, an *index auctorum*, an *index titulorum*, and *addenda et corrigenda*. FHG I has a unique introduction at the beginning of the volume for all the authors collected in it (*de vita et scriptis auctorum, quorum fragmenta hoc volumine comprehenduntur*) and its own *index nominum et rerum* at the end of the volume. The Parian Marble and the Rosetta Stone have separate introductions and the Rosetta Stone has a separate index (*Table de mots grecs, et des principaux faits expliqués*). Starting from FHG II and when necessary, introductions to authors are printed at the beginning of each relevant section. *Addenda et corrigenda* of volumes I–IV and the *index nominum et rerum* of volumes II–IV are printed at the end of FHG IV. This volume includes also and *index auctorum* and an *index titulorum* of volumes I–IV.[8]

As anticipated in chapter 1, the volumes of Karl Müller were followed and superseded by the collection of *Die Fragmente der griechischen Historiker* (FGrHist) edited by Felix Jacoby (pp. 35 ff.). In a fundamental paper about the plan for a new collection of the fragments of the Greek historians (*Über die Entwicklung der griechischen Historiographie und den Plan einer neuen Sammlung der griechischen Historikerfragmente*), Felix Jacoby explains the reasons of his enterprise and discusses advantages and disadvantages of four different principles for arranging collections of historical fragments:[9] 1) alphabetical order (*alphabetische Ordnung*), 2) chronological order (*chronologische Ordnung*), 3) local order (*lokale Ordnung*), and 4) historical development (*das Entwicklungsgeschichtliche*

---

7   FHG V *pars altera* v–viii.

8   A few additions and annotations to the FHG were published in a short text by Dorschel (1873). See also Heitz (1871).

9   Jacoby (1909). This paper is now available in the English translation by Mortimer Chambers and Stefan Schorn, which is based on the 1956 version of the text that was published with editorial additions of Herbert Bloch in a selection of Jacoby's essays and reviews: Jacoby (1956); Jacoby (2015).

Prinzip). Jacoby asserts his decision to follow the principle of the historical development, which means the arrangement of the historical writings according to literary genres. As a matter of fact, this is the principle that would have guided the publication of fragmentary historians in the FGrHist and whose structure (*die Gesamtanlage der Fragmentsammlung*) is explained in the above mentioned paper. While doing this, Jacoby also describes the limits of Karl Müller's collection complaining about "the lack of independence, the failure of criticism, and the incompleteness of the collection [...] the inconvenient, at many times absolutely arbitrary order of the fragments and the authors [...]" and about the fact that "the chronological boundaries of the separate books are not useful and are usually wrongly determined [...]."[10]

Limits and lacks of the work of Müller are well known in the scholarly community. It's also indisputable that the collection of the FGrHist represents a huge advancement in the editorial practice of historiographical studies and that its monumental result is still an unsurpassed product of 20th-century philology. Nevertheless, the goal of this book is *not* to discuss limits of the FHG and praise scientific achievements of the FGrHist, but to describe how fragmentary authors and works can be collected and edited in a computational environment.

The following sections describe the *Digital Fragmenta Historicorum Graecorum* (DFHG) project, which is *not* a new edition of ancient Greek fragmentary historians, but a digital model to provide textual, philological, and computational methods for representing fragmentary authors and works in digital libraries. The reason for choosing the collection of the FHG depends on different factors:[11] 1) an interest in Greek fragmentary historiography, which offers many examples of reuse of prose texts whose complexities are shared by other genres of fragmentary literature;[12] 2) the necessity of digitizing printed editions and preserving them not only as image files but also as structured machine readable collections that can be accessed for experimenting with text mining of historical languages;[13] 3) the importance of the FHG for understanding more recent editions of Greek historical fragments and in particular the FGrHist by Felix Jacoby, who spent his life to change and improve the collection created by Karl Müller;[14] 4) the fact that the corpus of the FHG is open (i.e., free of copyright) and big enough to perform computational experiments and obtain results.

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10   Jacoby (1909) 80–81 = Jacoby (2015) 1–2.
11   Berti (2019b); Berti (2019c).
12   Berti (2012); Berti (2013a).
13   This is also the reason why the publisher Brill has released the printed edition of FGrHist I–III as a CD-ROM and now as part of the *Jacoby Online* project (see section 2.1.2).
14   Cf. Strasburger (1977) 7 n. 20, 11 and 22.

4.2 The DFHG Project

The *Digital Fragmenta Historicorum Graecorum* (DFHG) is a project with a twofold aim: 1) digitize and preserve printed critical editions of fragmentary authors and 2) digitally represent *fragmenta* of lost authors and works according to the model of the technology of the printed book.[15] The reasons for choosing the collection of the *Fragmenta Historicorum Graecorum* have been explained in section 4.1. Also, the goal of the DFHG project is not isolated. In the broad field of the digital humanities, the digitization of printed editions has quite a long history, and impressive results are now available thanks to initiatives like *Google Books*, *Internet Archive*, *HathiTrust* and *Europeana*, just to mention some of the most important collections.

In the field of Classical philology and specifically of fragmentary historiography, a parallel project is the *Jacoby Online*, part of which is dedicated to the digital preservation of the printed volumes of *Die Fragmente der griechischen Historiker* edited by Felix Jacoby (see pp. 63 ff.). Even if the common goal is to preserve printed critical editions of historical fragments, there are significant differences between the *Jacoby Online* and the DFHG. Data and accessibility to the DFHG project are open, not only because the volumes of the FHG are out of copyright, but also because this is a research project born in the spirit of the *Open Greek and Latin* (OGL) initiative and developed in an academic institution and not in a publishing company.[16] The DFHG doesn't include a new edition of the fragments like the *Brill's New Jacoby*, but extracts and expands DFHG data for further implementations and connections with other editions and *corpora*. Extraction and expansion of DFHG data involve philological interpretations and editorial decisions that build a model for a new form of digital critical editing. Finally, DFHG data and their implementation are important not only for a better understanding of ancient Greek fragmentary historiography, but also for contributing to the increase of digital data in the original ancient language, which is now essential and urgent for future advancements in the field of Digital Classical Philology.[17]

In its current version, the DFHG project was developed between 2015 and 2018. The starting point was the Optical Character Recognition (OCR) output of the five volumes of the FHG that was produced as part of the OGL project.[18]

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15 The project is available at http://www.dfhg-project.org. On the discussion about the use of the terms "digitized" and "digital" to refer to digital scans of books, see Sahle (2016) and Huskey (2019) 21 n. 8. In this respect, the DFHG project adopts the form "digital" because it is not a mere scan of the *Fragmenta Historicorum Graecorum*, but a philologically expanded and enriched version of it.

16 On the OGL project and related activities, see Muellener (2019).

17 On these two last aspects, see the contributions in Berti (2019a).

18 See section 4.3.1.

Most of the work was spent on structuring the OCR output in order to produce a database of the entire FHG collection. Parallel and sequent work was focused on the creation of *tools* and *add-ons* that are extensively described in sections 4.3 and 4.4.

The DFHG project has been processing the following FHG data: 5 volumes, 636 authors, 979 fragmentary works, 7256 fragments, 7925 source texts, and 2,315,700 tokens.[19]

Figure 4.1. DFHG home page

The goal of the project was not only to produce digital data of ancient Greek historical fragments, but also to implement a model for a Digital Classics project that is sustainable in terms of temporal, financial, and computational resources.[20] This is the reason why the project is first of all focused on the philological structure of the FHG collection in order to organize it in a database that permits the extraction of structured DFHG data for producing different types of philological resources. Moreover, DFHG data is downloadable and exportable for future de-

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19   The expression *fragmentary works* refers to the number of titles of fragmentary works attested in the FHG. *Fragments* refers to the number of fragments collected in the FHG even if they include more than one source text (on this issue, see p. 151 n. 51). *Source texts* refers to the number of extant texts collected in the FHG because they preserve quotations and text reuses of other texts, and their number is bigger than the number of *fragments* because it happens that Karl Müller collects more sources under the same fragment number. For an expanded catalog of DFHG fragmentary authors and witnesses, see sections 4.4.1 and 4.4.2.

20   Cf. Cayless (2019).

velopments of the project and for further implementations by other scholars.[21] From a computational point of view, the DFHG project was conceived to be modular and easy to be updated and accessed. The modularity is based on creating views of the data and services to analyze it around a database that represents the original work of Karl Müller. The facility of updating data is guaranteed by the structure of the database — that was projected more like a data warehouse than a relational database — in order to be easily updated through loading CVS files generated directly from the OCR output of the FHG volumes. Data is accessible through web-based services or APIs that manage it live. Web-based services are AJAX oriented and make use of some of the state-of-the-art techniques like asynchronous loading to guarantee the best possible usability (fig. 4.2). APIs are coded to facilitate third-party services interaction with DFHG data.

The result is that the entire structure facilitates updates of the project in order to follow technological advancements without a significant economical effort using open source and free software for database and scripting technology. Another fundamental aspect is that all services are web-based so that users don't have to install complex frameworks to access data. The usage of modern web design technologies (as for example AJAX) and of database capabilities allow to create a series of advanced tools that are very powerful but light, like the DFHG *Digger* and other tools for visualizing data that offer services without loading the page.[22]

As already mentioned in section 4.1 and as it is possible to read in the following pages, the collection of the *Fragmenta Historicorum Graecorum* adequately represents the complexities of fragmentary authors and works because it includes the most important characteristics of modern critical editions of historical fragments, whose major achievement would have been reached by Felix Jacoby in the FGrHist. In this respect, the representation of the FHG in the DFHG project offers a model for the digital representation of *fragmenta*, by which I mean a digital representation of historical quotations and text reuses based on the technology of the printed book.[23] This is the reason why the implementation of the DFHG project has focused its attention on the element of the *fragmentum* as it was conceived and represented by Karl Müller in his collection.

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21   See sections 4.3.6 and 4.3.7.
22   See sections 4.3 and 4.4.
23   For another digital model of working with *fragmenta* and representing them as quotations and text reuses within their context of transmission, see the *Digital Athenaeus* project in chapter 5.

Figure 4.2. DFHG asynchronous loading

4.3 DFHG Tools

The DFHG provides users with a set of *tools* for accessing, querying, searching, integrating, citing and exporting the collection of the *Fragmenta Historicorum Graecorum* (fig. 4.3). These tools are based on the conversion of the printed edition of the FHG into a digital format and are described in the following subsections: Content (4.3.1), Digger (4.3.2), Search (4.3.3), Integration (4.3.4), Data Citation (4.3.5), Web API (4.3.6), and Outputs (4.3.7).
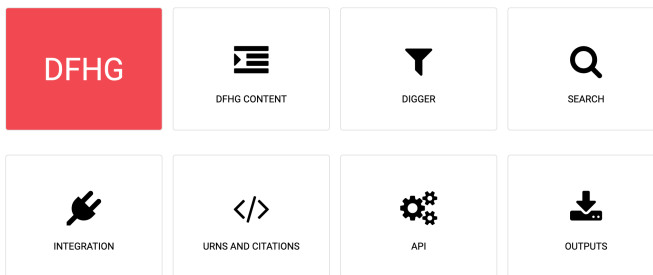
Figure 4.3. DFHG tools

4.3.1 Content

The DFHG *Content* is the entire content of the five volumes of the FHG, which is accessible online at http://www.dfhg-project.org. The online *content* can be browsed by loading the whole collection or one single volume from the homepage of the project (fig. 4.1). The DFHG slide in/out navigation menu represents the structure of volumes, books, authors, works and fragments collected in the printed edition, and it is available for the entire collection and for each volume. The menu faithfully represents the arrangement of authors and texts in the FHG. The "Expand All" and "Collapse All" functions allow scholars to navigate the FHG with a comprehensive view of the structure of the whole collection by expanding and collapsing every volume, book, author and work down to the fragment level. This structure is very helpful because the printed version of the FHG doesn't contain detailed tables of contents of its volumes. At the beginning of each volume there is a list of authors collected in it, but these lists are not complete because they don't always include authors collected in sections that group more than one authors. For example, FHG II lists at the beginning only the name of Dionysius Milesius, whose fragments open a section that includes also the fragments of

Dionysius Mytilenaeus and Dionysius Rhodius or Samius (pp. 5–11). All author names and work titles of voll. I–IV are available in the *index auctorum* and in the *index titulorum* printed at the end of volume IV, but these indices are not meant to be a list of contents of the whole collection. Only FHG V includes two tables of contents for its two parts: p. 211 (*scripta quae hoc volumine continentur*) and p. 421 (*table des matières*).

Navigation Menu

| Expand All | Collapse All |

- **+ Volumen primum**
- **− Volumen secundum**
  - − PRAEFATIO
  - + DE INSIDIIS QUAE REGIBUS STRUCTAE SUNT EXCERPTA
  - + LIBER PRIMUS
  - + LIBER SECUNDUS
  - + LIBER TERTIUS
  - + LIBER QUARTUS
  - − ADDENDA ET CORRIGENDA
- **+ Volumen tertium**
- **+ Volumen quartum**
- **+ Volumen quintum pars prior**
- **+ Volumen quintum pars altera**
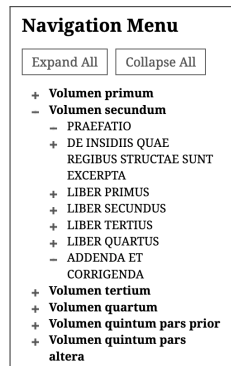
Figure 4.4. DFHG navigation menu (partly expanded)

Following each *navigation menu* element, users are able to jump to the relevant section of the FHG without reloading the page (fig. 4.4).[24] The navigation menu gives access to the following contents as they are arranged in the FHG: *volumina* (FHG I–V), *praefationes* (FHG I, II, IV and V), *libri* and other volume divisions (FHG I–V), list of authors, works, books and fragments (FHG I–V), *Index Nominum et Rerum* (FHG I), *Index Marmoris Rosettani* (FHG I), *addenda et corrigenda* (FHG I–V).[25] The DFHG *main page* of the entire collection and of each volume allows to visualize and navigate the following contents (fig. 4.5):

A) introductions to FHG authors with notes;[26]

B) five-item rows for each fragment with the following data:

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24 The DFHG appears as an Ajax web page automatically generated by a PHP script that queries an SQL database of FHG contents. For a more detailed description of the visualization of the DFHG main page, see section 4.3.1.2.

25 FHG III doesn't have a *praefatio*. Still missing in the DFHG are the *index auctorum*, the *index titulorum*, and the *index nominum et rerum* of volume II–IV that are printed at the end of FHG IV, and the indices of the two sections of FHG V. Also, *addenda et corrigenda* in the DFHG are represented as separate web pages at the end of each volume because their integration in the relevant passages of the collection would have required too much manual work. For a description of *libri* and other divisions of the FHG, see section 4.1.

26 FHG I has a unique introduction, which has been split into sections corresponding to each author of the volume and inserted in the DFHG at the beginning of the relevant author section. In this case the DFHG follows the model of the other FHG volumes, where almost every author has a separate introduction (see below).

1) the number of the fragment with links to the relevant page of the printed edition of the FHG, to the *Index Nominum et Rerum*, and to the *OpenNLP POSTagger for Ancient Greek*,[27]
2) a reference to the source text of the fragment (sometimes with a short or long commentary),
3) the Greek or the Latin text of the fragment,
4) the Latin (or French) translation/summary of Greek fragments,
5) the Latin (or French) commentary to the text of the fragment;

C) two- or three-item rows for still surviving sources:[28]
  1) the Greek text,[29]
  2) the Latin (or French) translation,
  3) the commentary sometimes with notes.

Figure 4.5. DFHG main page: fragment view

The grey sidebar of the main page shows page numbers of the printed edition of the FHG with links to the corresponding pages in *Google Books*, which are identified by URLs that embed these pieces of information:[30]

```
{{Google books|id|title|page=}}
```

The |id= parameter is a string of twelve characters that identifies books in *Google*

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27 On the *OpenNLP POSTagger for Ancient Greek*, see Celano et al. (2016). On its integration in the DFHG, see p. 165.
28 E.g., Apollodorus' *Bibliotheca*, the *Marmor Parium*, and the *Marmor Rosettanum* in FHG I, or Diodorus Siculus in FHG II.
29 The text includes also a reference to chapters and sections of the work and a link to the *OpenNLP POSTagger for Ancient Greek* and to the *Index Marmoris Rosettani*.
30 See https://en.wikipedia.org/wiki/Template:Google_books.

Books. The following are the *Google Books* IDs for the *Fragmenta Historicorum Graecorum*: FHG I (`y5pxAAAAIAAJ`), FHG II (`JA9DAAAAcAAJ`), FHG III (`beoUAAAAQAAJ`), FHG IV (`quBFAQAAMAAJ`), and FHG V (`_N8GAAAAQAAJ`). The `|page=` parameter links specific page numbers. In the case of the FHG, there are pages for the inside cover (`|pg=PP`), pages with Roman numerals (`|pg=PR`), and pages with Arabic numerals (`|pg=PA`). These strings correspond to the actual pages of the printed edition and allow to automatically generate *Google Books* URLs that link to FHG pages. Pages of the three parts of FHG V (*pars prior*, *première partie* and *seconde partie* of *pars altera*) are distinguished by adding `RA1`, `RA2`, and `RA3` before the page number (e.g., `|pg=RA2-PA48`) in order to avoid conflicting URLs for the same page numbers of different parts of the volume.[31]

In order to produce this visualization, the printed edition of the FHG has been digitized and the output has been structured in a textual database. Each volume has been OCRed by the social enterprise *Digital Divide Data* (DDD) and released in five text files with a basic XML encoding that represents the layout of each volume.[32] Three XML tags are used in these files: `<body>` for each page of the FHG, `<p>` for each paragraph within each page, and `<pb>` for each page number. Other main elements of the layout of each page — as for example titles of FHG sections and numbers of fragments — can be identified because they are outside of XML tags and disposed in separate lines. Figures 4.6 and 4.7 show the first page of the section with the fragments of Timaeus of Tauromenius (FHG I 193). In the OCR output, elements outside of XML tags are arranged in separate lines as they were originally arranged in the printed edition: title section (TIMAÆI|FRAGMENTA), work titles and subtitles (ΙΣΤΟΡΙΑΙ.|ΙΤΑΛΙΚΑ ΚΑΙ ΣΙ-ΚΕΛΙΚΑ.), book divisions (LIBER PRIMUS.) and fragment numbers (1. and 2.). Within each `<p>` tag, the arrangement of the text in different lines doesn't correspond to the original disposition of the text in the printed edition.[33]

All these characteristics have been used to structure semi-automatically the contents of the entire collection of the FHG and produce a textual database. First of all the structure has been generated by identifying the two main following

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31 Due to the presence of the same page numbers in different parts of FHG V, it is possible that page links of FHG V in the DFHG don't point to the extact location in *Google Books*.

32 This release is part of the *Open Greek and Latin* (OGL) project developed at the Institute of Computer Science at the University of Leipzig in collaboration with the *Perseus Project*. On the acquisition of historical texts in electronic form with the Optical Character Recognition (OCR) technique, see Piotrowski (2012) 25–52. On OCR for ancient Greek and for critical editions of Classical sources, see Robertson (2019). On OCR post-correction in the DFHG project, see section 4.4.4.

33 Philological editions have complex layouts and OCR engines still fight to recognize and structure all their components. For experiments of models to automatically infer the structural markup of a printed edition in order to produce a richer TEI document, see Balasubramanian (2019).

TIMÆI

FRAGMENTA.

ΙΣΤΟΡΙΑΙ.

ΙΤΑΛΙΚΑ ΚΑΙ ΣΙΚΕΛΙΚΑ.

LIBER PRIMUS.

1.

Schol. Apollon. Rhod. IV, 965: Τίμαιος Θρι-
ναχίαν φησὶ καλεῖσθαι τὴν Σικελίαν, ὅτι τρεῖς ἄκρας
ἔχει. Οἱ δὲ ἱστορικοὶ Θρίνακον φασὶν ἄρξαι τῆς Σικε-
λίας. Μύλας δὲ, χερρόνησον Σικελίας, ἐν ᾗ αἱ τοῦ
Ἡλίου βόες ἐνέμοντο. Scholl. Pariss.: Τρινακρία δὲ
ἡ Σικελία, κατὰ μὲν Τίμαιον, διὰ τὸ τρεῖς ἔχειν
ἄκρας, κατὰ δέ τινας τῶν ἱστορικῶν, ἀπὸ Τρίνακος
τοῦ τῆς Σικελίας ἄρξαντος. Μύλας δέ φησι χερρόνη-
σον εἶναι ἐν Σικελίᾳ, ἐν ᾗ αἱ τοῦ Ἡλίου βόες ἐνέμον-
το. Cf. Steph. Byz. s. v. Τρινακρία.

2.

Diodor. V, 6: Περὶ δὲ τῶν κατοικησάντων ἐν
αὐτῇ (sc. τῇ Σικελίᾳ) πρώτων Σικανῶν, ἐπειδή τινες
τῶν συγγραφέων διαφωνοῦσιν, ἀναγκαῖόν ἐστι συντό-
μως εἰπεῖν. Φίλιστος μὲν γάρ φησιν ἐξ Ἰβηρίας αὐ-
τοὺς ἀποικισθέντας κατοικῆσαι τὴν νῆσον, ἀπό τινος
Σικανοῦ ποταμοῦ κατ' Ἰβηρίαν ὄντος τετευχότας
ταύτης τῆς προσηγορίας. Τίμαιος δὲ τὴν ἄγνοιαν τού-
του τοῦ συγγραφέως ἐλέγξας ἀκριβῶς ἀποφαίνεται
αὐτόχθονας εἶναι· πολλὰς δὲ αὐτοῦ φέροντος ἀποδείξεις
τῆς τούτων ἀρχαιότητος, οὐχ ἀναγκαῖον ἡγούμεθα
περὶ τούτων διεξιέναι.

Quæ sequuntur ex eodem Timæo fluxisse vi-

dentur. — Sicanis successerunt ex Italia Siculi;
de his nihil exstat. Deinde apud Diodorum c. 9,
memorantur Cnidii et Rhodii, qui Ol. 50 in Si-
ciliam commigrarunt, post vero in Liparam in-
sulam transvecti sunt. Ex hac fortasse narratione
petita est mentio Atabyrii, incerti situs op-
pidi.

3.

Steph. Byz.: Ἀτάβυρον, ὄρος Ῥόδου. Ῥιανὸς ἕκτῳ
Μεσσηνιακῶν. Τὸ ἐθνικὸν Ἀταβύριος. Ἐξ οὗ καὶ
Ἀταβύριος Ζεύς. Ἔστι καὶ Σικελίας Ἀταβύριον, ὡς
Τίμαιος. Κέκληται δὲ τὰ ὄρη ἀπό τινος Τελχῖνος
Ἀταβυρίου. Ἔστι καὶ Περσικὴ πόλις. Ἔστι καὶ Φοι-
χης.

4.

Parthen. Erot. c. 29: Ἱστορεῖ Τίμαιος Σικελι-
κοῖς. Ἐν Σικελίᾳ δὲ Δάφνις Ἑρμοῦ παῖς ἐγένετο,
σύριγγί τε δεξιῶς χρήσασθαι, καὶ τὴν ἰδέαν ἐκπρε-
πής. Οὗτος εἰς μὲν τὸν πολὺν ὅμιλον ἀνδρῶν οὐ κατῄει·
βουκολῶν δὲ κατὰ τὴν Αἴτνην χείματός τε καὶ θέρους
ἠγραύλει. Τούτου λέγουσιν Ἐχεναΐδα νύμφην ἐρα-
σθεῖσαν παρακελεύσασθαι αὐτῷ γυναικὶ μὴ πλησιά-
ζειν· μὴ πειθομένου γὰρ αὐτοῦ συμβήσεται τὰς ὄψεις
ἀποβαλεῖν. Ὁ δὲ χρόνον μέν τινα καρτερῶς ἀντεῖχε,
καίπερ οὐκ ὀλίγων ἐπιμαινομένων αὐτῷ. Ὕστερον δὲ
μία τῶν κατὰ τὴν Σικελίαν βασιλίδων οἴνῳ πολλῷ
δηλησαμένη αὐτὸν, ἤγαγεν εἰς ἐπιθυμίαν αὐτῇ μιγῆ-

ITALICA ET SICULA.

LIBER I.

1.

Trinacria vocatur Sicilia secundum Timæum, quod tria
habet promontoria.

2.

De Sicanis, primis Siciliæ incolis, quum scriptores non-
nulli sententiis varient, ut breviter aliquid disseramus,
necessarium est. Philistus quidem (fr. 3) ex Iberia per co-
loniæ deductionem translatos in possessionem terræ ve-
nisse affirmat, a Sicano, Iberiæ flumine quodam, nomen
illud sortitos. Sed Timæus ignorantiam scriptoris refel-
lens, indigenas esse liquido ostendit. Qui quia multas ad
demonstrandam horum antiquitatem rationes affert, ali-
quid illarum recensendum esse non arbitramur.

3.

Atabyrum, mons Rhodi, de quo Rhianus libro sexto Mes-

FRAGMENTA HISTORICORUM.

seniacorum mentionem facit. Gentile, Atabyrius. Ab hoc
monte Jupiter Atabyrius nomen habet. Est item Siciliæ
Atabyrium, teste Timæo. Montes ita dicti sunt a quodam
Atabyrio Telchine. Est hoc nomine etiam urbs Persica,
alia item Phœnicia.

4.

Scribit Timæus in Rebus Siculis: In Sicilia erat Da-
phnis, Mercurii filius, fistulis canere eximie doctus, et
insigni specie præditus. Is in frequentiam hominum non
veniebat, verum circa Ætnam boum pastor et hiemis et
æstatis tempore in agro pernoctabat. Hujus amore aiunt
Echenaidem nympham captam, injunxisse ei ne cuiquam
mulieri se applicaret. Si enim non obediret, futurum ut
oculis privaretur. Ille itaque aliquamdiu fortiter resistebat,
quamvis a plurimis vehementer impeteretur. Postremum
autem una ex Siciliæ reginis multo vino eum inficiens, in
concupiscentiam induxit, ut cum ea commisceretur: at-

13

Figure 4.6. FHG I 193: printed edition

```
30801    <body>
30802    TIMÆI
30803    FRAGMENTA.
30804    ΙΣΤΟΡΙΑΙ.
30805    ΙΤΑΛΙΚΑ ΚΑΙ ΣΙΚΕΛΙΚΑ.
30806    LIBER PRIMUS.
30807    1.
30808    <p>Schol. Apollon. Rhod. IV, 965: Τίμαιος θρινακίαν
30809    φησὶ καλεῖσθαι τὴν Σικελίαν, ὅτι τρεῖς ἄκρας
30810    ἔχει. Οἱ δὲ ἱστορικοὶ θρίνακον φασὶν ἄρξαι τῆς Σικελίας.
30811    Μύλας δὲ, χερρόνησον Σικελίας, ἐν ᾗ αἱ τοῦ
30812    Ἡλίου βόες ἐνέμοντο. Scholl. Pariss.: Τρινακρία δὲ
30813    ἡ Σικελία, κατὰ μὲν Τίμαιον, διὰ τὸ τρεῖς ἔχειν
30814    ἄκρας, κατὰ δέ τινας τῶν ἱστορικῶν, ἀπὸ Τρίνακος
30815    τοῦ τῆς Σικελίας ἄρξαντος. Μύλας δέ φησι χερρόνησον
30816    εἶναι ἐν Σικελία, ἐν ᾗ αἱ τοῦ Ἡλίου βόες ἐνέμοντο
30817    Cf. Steph. Byz. s. v. Τριωακρία.</p>
30818    2.
30819    <p>Diodor. V, 6: Περὶ δὲ τῶν κατοικησάντων ἐν
30820    αὐτῇ (sc. Τῇ Σικελίᾳ) πρώτων Σικανῶν, ἐπειδή τινες
30821    τῶν συγγραφέων διαφωνοῦσιν, ἀναγκαῖόν ἐστι συντόμως
30822    εἰπεῖν. Φίλιστος μὲν γάρ φησιν ἐξ Ἰβηρίας αὐτοὺς
30823    ἀποικισθέντας κατοικῆσαι τὴν νῆσον, ἀπό τινος
30824    Σικανοῦ ποταμοῦ κατ᾽ Ἰβηρίαν ὄντος τετευχότας
30825    ταύτης τῆς προσηγορίας. Τίμαιος δὲ τὴν ἄγνοιαν τούτου
30826    τοῦ συγγραφέως ἐλέγξας ἀκριβῶς ἀποφαίνεται
30827    αὐτόχθονας εἶναι· πολλὰς δὲ αὐτοῦ φέροντος ἀποδείξεις
30828    τῆς τούτων ἀρχαιότητος, οὐχ ἀναγκαῖον ἡγούμεθα
30829    περὶ τούτων διεξιέναι.</p>
30830    <p>Quæ sequuntur ex eodem Timæo fluxisse videntur.
30831    — Sicanis successerunt ex Italia Siculi;
30832    de his nihil exstat. Deinde apud Diodorum c. 9,
30833    memorantur Cuidii et Rhodii, qui Ol. 5o in Siciliam
30834    commigrarunt, post vero in Liparam insulam
30835    transvecti sunt. Ex hac fortasse narratione
30836    petita est mentio Atabyrii, incerti situs oppidi.</p>
30837    3.
30838    <p>Steph. Byz.: Ἀτάβυρον, ὄρος Ῥόδου. Ῥιανὸς ἕκτῳ
30839    Μεσσηνιακῶν. Τὸ ἐθνικὸν Ἀταβύριος. Ἐξ οὗ καὶ
30840    Ἀταβύριος Ζεύς. Ἔστι καὶ Σικελίας Ἀταβύυριον, ὡς
30841    Τίμαιος. Κέκληται δὲ τὰ ὄρη ἀπό τινος Τελχῖνος
30842    Ἀταβυρίου. Ἔστι καὶ Περσικὴ πόλις. Ἔστι καὶ Φοινίκης.</p>
30843    4.
30844    <p>Parthen. Erot. c. 29: Ἱστορεῖ τίμαιος Σικελικοῖς.
30845    Ἐν Σικελίᾳ δὲ Δάφνις Ἑρμοῦ παῖς ἐγένετο.
30846    σύριγγί τε δεξιὸς χρήσασθαι, καὶ τὴν ἰδέαν ἐκπρεπής.
30847    Οὗτος εἰς μὲν τὸν πολὺν ὅμιλον ἀνδρῶν οὐ κατῄει·
30848    βουκολῶν δὲ κατὰ τὴν Αἴτνην χείματός τε καὶ θέρους
30849    ἠγραύλει. Τούτου λέγουσιν Ἔχενα(??)δα νύμφην ἐρασθεῖσαν
30850    παρακελεύσασθαι αὐτῷ γυναικὶ μὴ πλησιάζειν·
30851    μὴ πειθομένου γὰρ αὐτοῦ συμβήσεται τὰς ὄψεις
30852    ἀποβαλεῖν. Ὁ δὲ χρόνον μέν τινα καρτερῶς ἀντεῖχε,
30853    καίπερ οὐκ ὀλίγων ἐπιμαινομένων αὐτῷ. Ὕστερον δὲ
30854    μία τῶν κατὰ τὴν Σικελίαν βασιλίδων οἴνῳ πολλῷ
30855    δηλησαμένη αὐτὸν, ἤγαρεν εἰς ἐπιθυμίαν αὐτῇ μιγῆ—
30856
30857    ITALICA ET SICULA.
30858    LIBER I.
30859    1.
30860    <p>Trinacria vocatur Sicilia secundum Timæum, quod tria
30861    habet promontoria.</p>
30862    2.
30863    <p>De Sicanis, primis Siciliæ incolis, quum scriptores nonnulli
30864    sententiis varient, ut breviter aliquid disseramus,
30865    necessarium est. Philistus quidem (fr. 3) ex Iberia per coloniæ
30866    deductionem translatos in possessionem terræ venisse
30867    affirmat, a Sicano, Iberiæ flumine quodam, nomen
30868    illud sortitos. Sed Timæus ignorantiam scriptoris refellens,
30869    indigenas esse liquido ostendit. Qui quia multas ad
30870    demonstrandam horum antiquitatem rationes affert, aliquid
30871    illarum recensendum esse non arbitramur.</p>
30872    3.
30873    <p>Atabyrum, mons Rhodi, de quo Rhianus libro sexto MesFRAGMENTA
30874    HISTORICORUM.
30875    seniacorum mentionem facit. Gentile, Atabyrius. Ab hoc
30876    monte Jupiter Atabyrius nomen habet. Est item Siciliæ
30877    Atabyrium, teste Timæo. Montes ita dicti sunt a quodam
30878    Atabyrio Telchine. Est hoc nomine etiam urbs Persica,
30879    alia item Phœnicia.</p>
30880    4.
30881    <p>Scribit Timæus in Rebus Siculis : In Sicilia erat Daphnis,
30882    Mercurii filius, fistulis canere eximie doctus, et
```

Figure 4.7. FHG I 193: OCR output

components represented by 1) paratextual elements like prefaces, introductions, indices and *addenda et corrigenda*,[34] and 2) FHG authors:

1) Paratextual elements have been extracted and treated separately:

    a) Prefaces and *addenda et corrigenda* have been converted into HTML files including footnotes and have been published online at the beginning and at the end of each volume.[35]

    b) Introductions have been extracted and added to the corresponding parts in the DFHG. FHG I has a unique introduction (*de vita et scriptis auctorum, quorum fragmenta hoc volumine comprehenduntur*) that has been split into its subsections and added at the beginning of each relevant author of FHG I.[36] As mentioned before, in FHG II–IV almost every author has a separate introduction. The first part of FHG V has *prolegomena* that have been partly inserted at the beginning of the corresponding authors.[37] The second part of FHG V has separate introductions for each author.

    c) The *Index Nominum et Rerum* and the *Index Marmoris Rosettani* of FHG I have been structured in order to search their content.[38] In this case the OCR output includes <p> tags that correspond to single entries of the indices. These entries have been extracted and manually structured in their main components: main entry, subentries, descriptions, notes and references to passages where entries and subentries

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34   For the use of the adjective *paratextual*, cf. Genette (1982) 9.

35   FHG I: *praefatio* (i–vii); FHG II: *praefatio* (i–iv); FHG IV: *praefatio* (i–iii); FHG V (*pars prior*): *praefatio* (v–vi) and *prolegomena* (only vii–xxii: *de codicibus*); FHG V (*pars altera*): *préface* (v–viii) and *discours préliminaire* (ix–xxxi). The other pages of the *prolegomena* of the first part of FHG V (xxii–l: *de fragmento Aristodemi*; li–lv: *Critobulus*) have been inserted before the corresponding parts about Aristodemus and Critobuls in the online version. FHG I–IV: *addenda et corrigenda* (623–670 from volume IV); FHG V (*pars prior*): *addenda* (lvi–lxxi).

36   Hecataeus (ix–xvi), Charon (xvi–xx), Xanthus (xx–xxiii), Hellanicus (xxiii–xxxiii), Pherecydes (xxxiv–xxxvi), Acusilaus (xxxvi–xxxviii), Apollodorus (xxxviii–xlv), Antiochus (xlv), Philistus (xlv–xlix), Timaeus (xlix–lvii), Ephorus (lvii–lxv), Theopompus (lxv–lxxvii) and Phylarchus (lxxvii–lxxxi). The second part of the introduction is about the Atthidographers collected in the volume (*De Atthidum scriptoribus*: lxxxi–xci) and is arranged in two subsections about authors' lives (*Clidemi, Phanodemi, Demonis, Androtionis, Philochori et Istri vitae*) and works (*de operibus horum scriptorum*): Clidemus (lxxxii and lxxxvi–lxxxvii), Phanodemus (lxxxiii and lxxxvii), Demo (lxxxiii and lxxxvii–lxxxviii), Androtio (lxxxiii–lxxxiv and lxxxviii), Philochorus (lxxxiv–lxxxv and lxxxviii–xc) and Ister (lxxxv and xc–xci). The content of these pages including footnotes has been added in the DFHG at the beginning of each relevant author of FHG I. Morevoer, each of the two subsections about the Atthidographers is preceded by a short introduction that has been repeated at the beginning of each Atthidographer's section.

37   See n. 35.

38   See http://www.dfhg-project.org/DFHG/index_nominum_rerum_volumen_primum.php and http://www.dfhg-project.org/DFHG/index_marmoris_rosettani_volumen_primum.php.

occur. The online version of both indices provides links to every passage and to cross entries. These indices are also accessible through each fragment in the main page of the DFHG.[39]

2) FHG authors can be classified in three main categories:

a) Lost authors known through quotations and text reuses. Fragments of these authors are extracted from source texts and, whener possible, numbered by Müller according to their original belonging to works that are now lost.[40] Each fragment is preceded by an abbreviated reference to its source text and is sometimes followed by a short commentary. Müller doesn't provide a critical apparatus, but only translations into Latin (and in other cases into French) for Greek fragments. In terms of layout, fragments are arranged in two columns with corresponding columns for translations at the bottom of the page. Except for very few examples, *testimonia* are not collected in a separate section, but sometimes presented and discussed in the introduction to the author.[41]

b) Authors known through manuscripts and other written objects. For these authors Müller transcribes the text of manuscripts providing a translation into Latin in a parallel column and extended critical commentaries in footnotes. A special case of this category is represented by the two inscriptions of the Parian Marble and the Rosetta Stone, which are published in a separate appendix at the end of FHG I. Both documents have separate introductions and extended commentaries, and the text is presented with a translation in a parallel column.[42]

c) Still extant authors. This category is represented by the *Bibliotheca* of Apollodorus printed in FHG I.[43] The text is arranged in books, chapters, and sections with two columns in each page for the Greek text and its Latin translation.

Each of these categories presents complexities and special cases, but it is important and interesting to note that Karl Müller was very consistent when planning

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39 For a description of this functionality, see section 4.3.4.

40 Numbering depends on many different intepretations by the editor. This is the reason why there are different numberings in different editions of the same fragment. On this issue, cf. p. 84.

41 On the treatment of *testimonia* in the FHG and in other collections of fragmentary authors, see p. 33 part. n. 81.

42 The Parian Marble also includes other four columns with corresponding chronologies of the events mentioned in the chronicle. The final commentary (*annotatio*) is arranged by events: (*epochae*). The French translation and the commentary of the Greek text of the Rosetta Stone are arranged by lines of the inscription. See sections 4.5 and 4.6.

43 The difference with the previous category is due to the fact that in this case Müller publishes the text without critical notes at the bottom of the page.

his collection and publishing it, especially if we consider that the FHG was conceived and printed in thirty years of work in the second half of the 19th century.

The internal organization of the FHG has allowed to model a structure for the whole collection and prepare an SQL database. Three main typologies (`type`) have been identified for including paratextual elements and texts of authors of the FHG: 1) `intro` for introductions, 2) `fragment` for texts of lost authors preserved through quotations and text reuses, and 3) `extant text` for texts of still extant authors.[44] `type` is part of a database structure that includes a total of 28 fields for the entire collection:

1. `id`: (integer) the primary key of the database that keeps track of the order in which every text is published in the printed collection.[45]

2. `volume`: FHG volume name (Volumen primum, Volumen secundum, Volumen tertium, Volumen quartum, Volumen quintum pars prior, Volumen quintum pars altera).

3. `sub_volume`: internal divisions of FHG volumes from the second volume onwards (e.g., LIBER PRIMUS of FHG II).[46]

4. `sub_volume_note`: descriptions provided by Müller about internal divisions of FHG volumes.[47] In this case the description in the DFHG includes the entire text of the page that opens the relevant section. For example, FHG II 1 (LIBER PRIMUS): "INDE AB INCUNABULIS ARTIS HISTORICAE AD FINEM BELLI PELOPONNESIACI. 520–404 A.C. NOMINA AUCTORUM. CADMUS MILESIUS. [HECATAEUS MILESIUS.] DIONYSIUS MILESIUS. HIPPYS RHEGINUS. EUGEON SAMIUS. DEIOCHUS PROCONNESIUS. BION PROCONNESIUS. EUDEMUS PARIUS. DEMOCLES PYGELENSIS. AMELESAGORAS CHALCEDONIUS. [ACUSILAUS ARGIVUS.] [PHERECYDES LERIUS.] [CHARON LAMPSACENUS.] [XANTHUS LYDIUS.] [HELLANICUS MYTILENAEUS.] [ANTIOCHUS SYRACUSANUS.] GLAUCUS RHEGINUS. HERODORUS HERACLEENSIS. SIMONIDES CEUS. XENOMEDES CHIUS. ION CHIUS. STESIMBROTUS THASIUS. HIPPIAS ELEUS. DAMASTES SIGEENSIS. ANAXIMANDER MILESIUS. CRITIAS ATHENIENSIS. Fragmenta auctorum quorum nomina uncis inclusimus in primo hujus collectionis volumine leguntur." As in other cases, uppercase and lowercase letters are presented like in the printed text of the FHG.

5. `author`: FHG author name (e.g., APOLLODORUS ATHENIENSIS and STESIMBROTUS THASIUS: FHG I 104 and II 52). Seven authors in the FHG

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44   For the authors included in this typology, see section 4.3.1.1.

45   This field is of course fundamental, otherwise the sequence of texts in the printed edition would be lost.

46   For a detailed description of these internal divisions of the FHG, see pp. 129 ff.

47   See *ibid.*

have names printed within round and square brackets. FHG II: [DE-MODAMAS HALICARNASSENSIS]. FHG IV: (ACHAEUS), (AGATHOS-THENES), (HEGEMON ALEXANDRENSIS), (LEONIDES), (PAXAMUS) and (PHILALIUS CORINTHIUS). Brackets are preserved in the DFHG database and consequently in the DFHG *main page* and in the DFHG outputs.[48]

6. `section`: FHG author internal sections (e.g., PAMPHILAE EPIDAURIAE FRAGMENTA: FHG III 520).[49]

7. `work`: titles of works of authors collected in the FHG (e.g., ΒΙΒΛΙΟΘΗΚΗΣ of Apollodorus Atheniensis and ΠΕΡΙ ΠΟΙΗΤΩΝ ΚΑΙ ΜΟΥΣΙΚΩΝ of Glaucus Rheginus: FHG I 104 and II 23).[50]

8. `work_note`: commentaries about works of FHG authors (e.g., the note "Porphyrius ap. Eusebium in Pr. Ev. p. 467, D: Λυσιμάχου μέν ἐστι δύο (Βιβλία) Περὶ τῆς Ἐφόρου κλοπῆς" about the work ΠΕΡΙ ΕΦΟΡΟΥ ΚΛΟΠΗΣ of Lysimachus Alexandrinus: FHG III 342).

9. `work_section`: subdivisions of works of FHG authors (e.g., ΙΤΑΛΙΚΑ ΚΑΙ ΣΙΚΕΛΙΚΑ of the ΙΣΤΟΡΙΑΙ of Timaeus and DE SOPHOCLE of the work DE POETIS DRAMATICIS of Dicaearchus Messenius: FHG I 193 and II 247).

10. `work_section_note`: commentaries and descriptions of subdivisions of works of FHG authors (e.g., "Opus De Alcaeo, quantum e fragmentis colligitur, commentarius erat in Alcaei carmina exegeticus criticusque. Praemissa fuerit de vita et poesi Alcaei dissertatio" of the section ΠΕΡΙ ΑΛΚΑΙΟΥ of the ΒΙΟΙ ΦΙΛΟΣΟΦΩΝ of Dicaearchus Messenius: FHG II 246).

11. `book`: book divisions of works of FHG authors (e.g., LIBER PRIMUS of the ΓΕΝΕΑΛΟΓΙΑΙ of Hecataeus and ΒΙΒΛΙΟΝ Α of the *Bibliotheca* of Apollodorus Atheniensis: FHG I 25 and 104).

12. `book_note`: commentaries and descriptions of book divisions of works of FHG authors (e.g., Προυσίου συμπτώματα of the fourth book of the ΠΕΡΙΠΕΤΕΙΑΙ of Nicander Chalcedonius: FHG IV 462).

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48 See sections 4.3.6 and 4.3.7).

49 Usually these forms are taken from the header of the FHG page belonging to the relevant section.

50 In the first example, the genitive is due to the fact that the section with the *Bibliotheca* of Apollodorus starts with ΑΠΟΛΛΟΔΩΡΟΥ ΤΟΥ ΑΘΗΝΑΙΟΥ ΓΡΑΜΜΑΤΙΚΟΥ ΒΙΒΛΙΟΘΗΚΗΣ ΒΙΒΛΙΟΝ Α (APOLLODORI ATHENIENSIS BIBLIOTHECAE LIBER PRIMUS), which has been split into its components (`section`, `work`, and `book`). Greek titles have been represented in the form given by Müller in the FHG. If not available, Latin translations of titles provided by Müller have been used to produce the Greek form (e.g., ΙΣΤΟΡΙΑΙ of Pherecydes in FHG I 70, where there is only the Latin form HISTORIARUM in the genitive before the book number). And finally, if not present at all, they have been added in a Greek form according to the principles of the collection (e.g., the ΙΣΤΟΡΙΑΙ of Ephorus in FHG I 234). The reason for adding in the DFHG information that is missing in the FHG is due to the limits of the PHP visualization of the structure of the FHG in the main web page of the project. On this aspect, see section 4.3.1.2.

13. `chapter`: chapters of works of FHG authors (e.g., ΚΕΦΑΛΑΙΟΝ Γ of ΒΙ-ΒΛΙΟΝ Α of the *Bibliotheca* of Apollodorus Atheniensis: FHG I 105).

14. `section`: sections of chapters of works of FHG authors (e.g., section 3 of ΚΕΦΑΛΑΙΟΝ Β of ΒΙΒΛΙΟΝ Α of the *Bibliotheca* of Apollodorus Atheniensis and section XXXVIII of the fifteenth book of the ΠΕΡΙ ΗΡΑΚΛΕΙΑΣ of Memnon: FHG I 105 and III 545).

15. `sub_section`: subsections of works of FHG authors (e.g., subsection 3 of section 1 of ΚΕΦΑΛΑΙΟΝ Β of ΒΙΒΛΙΟΝ Α of the *Bibliotheca* of Apollodorus Atheniensis and subsection Ζ of section 7 of the ΠΕΡΙ ΤΩΝ ΕΝ ΠΑΙΔΕΙΑ ΔΙΑΛΑΜΨΑΝΤΩΝ (ΣΟΦΩΝ) of the ΙΣΤΟΡΙΑ ΡΩΜΑΙΚΗ ΤΕ ΚΑΙ ΠΑΝ-ΤΟΔΑΠΗ of Hesychius Mylesius: FHG I 105 and IV 165).

16. `page`: pages of the FHG printed volumes.

17. `type`: one of the three typologies of FHG texts presented above (`intro`, `fragment`, and `extant text`).

18. `sub_type`: this field is for those parts where Müller adds commentaries about further witnesses to FHG authors or *addenda* to FHG sections (e.g., the commentary about other possible fragments of Hellanicus after fr. 179 and the text "Fragm. 66, p. 207, b, lin. 12 in graecis post verba οὐ προσ-ήρχοντο adde: οὔτε τοῦ ἱεροῦ ἐξήρχοντο; et in latinis pro nisi noctu lege: neque templo nisi noctu egrediebantur" added at the end of the fragments of Timaeus: FHG I 69 and 233).

19. `fragment_number`: numbers assigned by Müller to fragments of FHG authors (e.g., fragment 3 of TIMAEI FRAGMENTA: FHG I 193).

20. `fragment_letter`: letters added by Müller to fragment numbers in order to distinguish different witnesses of the same fragment (e.g., fragments 33a–h of Pherecydes: FHG I 79–80). In this case Müller is not always consistent and there are examples of fragments with more than one witness under the same number but without disambiguating letters, like frr. 44 and 46 of Pherecydes (FHG I 83–84). In this case the DFHG keeps and represents FHG inconsistencies and doesn't add letters that don't appear in the printed edition, even if this is not ideal for a computational database. The *Thesaurus Linguae Graecae* (TLG) includes fragments from the FHG and generally adds letters to fragment numbers if they are missing. An interesting example is fr. 1 of Apollodorus (FHG I 428). In this case Müller doesn't number the first witness of the work Περὶ θεῶν at 428 (Photius Cod. CLXI), but starts the numbering with the following two witnesses (Stephan. Byz., s.vv. Δωδώνη and Βωδώνη), which are numbered as fr. 1 of the first book of the same work Περὶ θεῶν. In this case, given that a fragment number is necessary, the DFHG numbers Photius as fr. 1a and the two following

witnesses by Stephanus of Byzantium as fr. 1b.[51]

21. `fragment_note`: notes about fragments (e.g., the information Περὶ ἀνδριάν-
των καὶ ἀγαλμάτων printed before the text of fragment 45 of Hegesander
Delphus) and non-alphabetic characters that sometimes are added after the
number of the fragment to mean uncertainty, like *parentheses* (e.g., FHG I
56 fr. (83); FHG II 14 fr. (5) and 361 frr. (4) and (5)), *square brackets* (e.g.,
FHG II 29 fr. [2] and 34 fr. [22]), and *question marks* (e.g., FHG I 1 frr. 5
(?) and 7 (?)). FHG IV 421. Generally *parentheses* mean that Müller is not
sure about the attribution of a fragment to an author (reasons vary a lot),
square brackets are used by Müller to suggest the attribution of a fragment
to a certain author, and *question marks* indicate that the name of the frag-
mentary author is not mentioned by the source text, but that it's possible
to propose an attribution to a certain author.[52]

22. `witness`: source texts of fragments (e.g., Athenaeus X 447, C as witness of
fragment 110 of Hellanicus: FHG I 59).[53]

23. `text`: actual text of paratextual elements, fragments, and extant texts of
FHG authors.

24. `clean_text`: it represents the text of the field `text` without punctuation and
with lowercase letters.

25. `urn_text`: each word of the text of the field `clean_text` is numbered with its
occurrence (e.g., "ἀκουσίλαος[1] ὁ[1] ἀργεῖος[1] ἐκ[1] καβείρης[1] καὶ[1]
ἡφαίστου[1] κάμιλον[1] λέγει[1] τοῦ[1] δὲ[1] τρεῖς[1] καβείρους[1] ὧν[1]
νύμφας[1] καβειράδας[1]" of fragment 6 of Acusilaus: FHG I 100). Num-
bering the occurrences of each word is essential for generating URNs of
DFHG texts (see section 4.3.5). The space between words is the delimiter
that transforms each text in an array of words. Words have lowercase let-
ters because in this way it is possible to detect equal words and number
their occurrences. Numbering words is computationally heavy and this is
the reason why the text is processed during the upload and the informa-
tion is stored in the database. `clean_text` and `urn_text` are two fields that
are preprocessed in order to speed up some capabilities, like the creation
of URNs in the visualization.[54]

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51 The TLG adopts the same numbering, while in other cases it adds letters and also other
numbers, as for frr. 44 and 46 of Pherecydes (TLG frr. 44a–c and 46a–f) or for fr. 33a of
the same author (TLG frr. 33a1–3).

52 On the encoding of these elements according to the guidelines of TEI EpiDoc, see Berti/
Almas et al. (2014–2015) 17 and section 4.3.7.

53 On the complexities of references to source texts in the FHG and on their extraction, see
section 4.4.2.

54 See section 4.3.5.

26. `translation`: translations of FHG texts into Latin or French.[55]
27. `commentary`: commentaries to fragments and texts of FHG authors (e.g., "Situs incertus. Sed ibi Hecataeus etiam *Phalannam* videtur recensuisse, quae ad borealem Penei ripam sita erat, cujus meminit in Historiis (fr. 333) ut urbis Perrhaeborum. (Steph. Φάλαννα· Ἐκ. Ἱππίαν αὐτὴν καλεῖ)", which is a commentary to fragment 113 of Hecataeus: FHG I 8). This field is also for critical notes about manuscripts, as for example FHG II vii.
28. `note`: footnotes of the printed pages of the FHG.

Figures 4.8 and 4.9 show an example of the DFHG structured output of the fragments of Timaeus of Tauromenium that has been semi-automatically generated according to the structure that has just been described.[56] Two files (with pipes | as separators) have been produced for the texts of the fragments (structured output 1) and for their Latin translations (structured output 2) including work titles and subtitles. These files have been used to generate the SQL database of the entire DFHG collection, whose structure is accessible through a web API and through CSV and XML outputs.[57]

4.3.1.1 Authors and Works

As anticipated at p. 148, one of the three typologies that have been identified for classifying texts of the collection of the *Fragmenta Historicorum Graecorum* is represented by `extant text`. This typology is used in the database of the DFHG to label texts of the FHG that have to be distinguished by those preserved through quotations and text reuses in other sources (type `fragment`). As we know, the term *fragmentum* can be quite misleading and Classical scholarship has been debating a lot about different possible classifications of fragmentary texts.[58] In this case the aim of the DFHG project is not to propose a new ontology for classifying fragmentary texts, but to highlight characteristics of the method of Karl Müller, who was able to collect many different kinds of historical fragmentary texts under the heading *fragmenta* and to keep a relatively simple structure which is also recognizable in the layout of the printed edition.

In this section, I list authors and works of the FHG that have been classified as `extant text` in the database of the *Digital Fragmenta Historicorum Graecorum*. The following list is very interesting because it includes a significant group of

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55 FHG V doesn't include Syriac and Armenian texts, but only their French translations. For experiments on automatic alignments of FHG texts with their translations, see Yousef/Berti (2015) and Berti/Bizzoni et al. (2016).
56 In this example, the type is `fragment`.
57 See sections 4.3.6 and 4.3.7.
58 See pp. 86 ff.

```
1    ##type##:fragment
2    ##volume##:Volumen primum
3    ##author##:TIMAEUS
4    ##section##:TIMAEI FRAGMENTA
5    ##work##:ΙΣΤΟΡΙΑΙ
6    ##work_section##:ΙΤΑΛΙΚΑ ΚΑΙ ΣΙΚΕΛΙΚΑ
7    ##book##:LIBER PRIMUS
8    ##page##:193
9    1.|||Schol. Apollon. Rhod. IV, 965:|Τίμαιος θρινακίαν φησὶ καλεῖσθαι τὴν Σικελίαν, ὅτι τρεῖ
10   1.|||Scholl. Pariss.:|Τρινακρία δὲ ἡ Σικελία, κατὰ μὲν Τίμαιον, διὰ τὸ τρεῖς ἔχειν ἄκρας, κ
11   2.|||Diodor. V, 6:|Περὶ δὲ τῶν κατοικησάντων ἐν αὐτῇ (sc. τῇ Σικελίᾳ) πρώτων Σικανῶν, ἐπειδ
12   3.|||Steph. Byz.:|Ἀτάβυρον, ὄρος Ῥόδου. Ῥιανὸς ἕκτῳ Μεσσηνιακῶν. Τὸ ἐθνικὸν Ἀταβύριος. Ἐξ ο
13   4.|||Parthen. Erot. c. 29:|Ἱστορεῖ Τίμαιος Σικελικοῖς. Ἐν Σικελίᾳ δὲ Δάφνις Ἑρμοῦ παῖς ἐγέν
14   ##page##:194
15   5.|||Schol. Apollon. Rhod. IV, 786:|Πλαγκταὶ πέτραι εἰ τῷ πορθμῷ εἰσίν, ὡς Τίμαιος καὶ Πεισ
16   6.|||Diodor. IV, 56:|Οὐκ ὀλίγοι τῶν τε ἀρχαίων συγγραφέων καὶ τῶν μεταγενεστέρων, ὧν ἐστι κ
17   7.|||Schol. Apollon. Rhod. IV, 1217:|Τιμῶναξ ἐν πρώτῳ τῶν Σικελικῶν ἐν Κόλχοις φησὶν Ἰάσονα
18   ##page##:195
19   8.|||Idem IV, 1153:|Ἱστέον ὅτι Τιμαίου λέγοντος ἐν Κερκύρᾳ τοὺς γάμους (sc. Μηδείας) ἀχθῆνα
20   9.|||Idem II, 400:|Κίρκαιον δὲ τόπος ἐστὶ τῆς Κολχίδος, ἀπὸ Κίρχης τῆς Αἰήτου ἀδελφῆς, ἣ πε
21   10.|||Praeter Argonantarum expeditionem Timaeus in primis Siculorum libris iter Herculis ex
22   11.|||Diodor. IV, 22:|Ὁ δ᾽ οὖν Ἡρακλῆς καταντήσας ἐπὶ τὸν πορθμὸν κατὰ τὸ στενότατον τῆς θα
23   12.|||Gell. Noctt. Att. II, 1:|Timaeus in Historiis, quas oratione graeca de rebus populi R
24   13.|||Tzetzes ad Lycophr. 615:|Ἁλούσης τῆς Τροίας Διομήδης ἀντὶ βάρους λίθους ἐκ τοῦ τείχου
25   ##page##:196
26   14.|||Idem ibid. 1137:|Αἱ δὲ τῶν Δαυνίων γυναῖκες μέαιναν ἐσθῆτα φοροῦσι, καὶ τὰς ὄψεις βάπ
27   15.|||Idem ibid. 1050:|Εἰώθασιν οἱ Δαύνιοι, ἤτοι οἱ Καλαβροὶ, ἐν μηλωταῖς καθεύδειν ἐν τῷ τ
28   16.|||Strabo V, p. 248:|Καὶ Τίμαιος δὲ περὶ τῶν Πιθηκουσσῶν φησὶν ὑπὸ τῶν παλαιῶν πολλὰ παρ
29   17.|||Antig. Caryst. c. 167:|Heraclides Ponticus paludem Sarmatiae esse dicit, quam ulla u
30   18.|||Athenaeus IV, I3, p. I53, D, de luxuria Etruscorum disserens,|Τίμαιος, inquit, ἐν τῇ
31   18.|||Idem XII p. 5I7, D:|Παρὰ δὲ Τυῤῥηνοῖς, ἐκτόπως τρυφήσασιν, ἱςτορεῖ Τίμαιος ἐν τῇ πρώτ
32   ##page##:197
33   19.|||Tertullian. De spectacul. c. I39, 28 Franecq. 1697:|Lydos ex Asia transvenas in Hetru
34   20.|||Dionys. Halic. Antiq. Rom. I, c. 67: Deos a Romanis Penates vocatos graece vario modo
35   21.|||Ibidem c. 74:|Περὶ μὲν οὖν τῶν παλαιῶν κτίσεων ἱκανὰ ἡγοῦμαι τὰ προειρημένα. Τὸν δὲ τ
36   21.|||Syncell. Chron. p. I55, in Corp. Scriptt. Ryz. tom. VII:|Τίμαιος μὲν πρὼην καὶ Καλλία
37   22.|||Plin. Hist. N. III, I3:|Servius rex primus signavit oes. Antea rudi usos Romoe Timoeu
38   23.|||Excerptt. ex Cod. Matrit. ad calcem Polyaen. ed. Tychsen. in Bibl. Gotting. liter. et
39   ##page##:198
40   24.|||Polyb. XII, 3, Exc. Vatic.:|Τὸν δὲ Τίμαιον εἴποι τις ἂν οὐ μόνον ἀνιστόρητον γεγονέναι
41   25.|||Ad librum, ubi de Libya sermonem instituit, referre possis locum de filiabus Atlantis
42   ##book##:LIBER II
43   26.|||Polyb. XII, 3:|Καθάπερ δὲ καὶ περὶ τῶν κατὰ Λιβύην ἀπεσχεδίακεν, οὕτω καὶ περὶ τῶν κα
44   27.|||Plin. H. N. III, 13:|Sardiniam ipsam Timoeus Sandaliotin appellavit ab effigie soleoe
45   ##page##:199
46   28.|||Tzetz. Ad lycophr. 796:|Ἡ δὲ Σαρδὼ, νῆσος περὶ τὰς Ἡρακλέας (leg. Ἡρακλείας) στήλας.
47   29.|||Suidas:|Σαρδάνιος γέλως. Ὁ προσποιητός. Καλεῖσθαι δὲ αὐτόν φασιν ἀπὸ τοῦ σεσηρέναι το
48   30.|||Strabo XIV, p. 654:|Τινὲς δὲ μετὰ τὴν ἐκ Τροίας ἔφοδον τὰς Γυμνησίας νήσους ὑπ᾽ αὐτῶ
49   31.|||Tzetz. Ad Lycophr. 633:|Αἱ δὲ Γυμνησίαι αὗται, νῆσοι περὶ τὴν Τυρανηίαν εἰσί. Μέμνητα
50   ##page##:200
51   32.|||Plin. H. N. IV, 16:|Timoeus historicus a Britannia introrsus sex dierum navigatione a
52   33.|||Idem ibid. IV, 27:|Insuloe complures sine nominibus eo situ (in Oceano septemtrionali
53   34.|||Idem ibid. XXVII, II:|Pytheas scribit, Guttonibus, Germanioe genti, accoli oestuarium
54   35.|||Idem ibid. IV, 22:|In ipso capite Boeticoe, ab ostio freti passuum XXV mill. Gadis, l
55   36.|||Plutarch. Deplacit. philos. p. 90I Wechel.:|Πῶς ἀμπώτιδες γίγνονται καὶ πλημμύραι; ιζ
56   37.|||Etym. M.:|Γαλατία, χώρα· ὠνομάσθη, ὥς φησι Τίμαιος, ἀπὸ Γαλάτου, Κύκλωπος καὶ Γαλατία
57   38.|||Strabo IV, p. I83:|Περὶ δὲ τῶν τοῦ Ῥοδανοῦ στομάτων, Πολύβιος μὲν ἐπιτιμᾷ Τιμαίῳ, φησ
58   ##page##:201
59   39.|||Steph. Byz.:|Μασσαλία, πόλις τῆς Λιγυστικῆς, κατὰ τὴν Κελτικὴν, ἄποικος Φωκαέων. Ἑκατ
60   40.|||Scymn. Chius Orb. descript. v. 208 sqq.|Μασσαλία δ᾽ ἐστὶ ἐχομένη πόλις μεγίστη, Φωκαῶ
61   41.|||Polyb. II, 16, I3, de Eridano:|Τἆλλα δὲ τὰ περὶ τὸν ποταμὸν τοῦτον ἱστορούμενα παρὰ τ
62   42.|||Scymn. Chius v. 404 sqq. (Geogr. min. T. II, p. 24) Hudsou.:|Ἑξῆς δὲ μεγάλη χεῤῥόνησο
63   43.|||Stephan. Byz.:|Ἀργύρινοι, ἔθνος Ἠπειρωτικὸν, ὡς Τίμαιος καὶ θέων. Καὶ Λυκόφρων· Εἰς Ἀ
64   44.|||Athenaeus XIII, 8, p. 602, F:|Τὸ παιδεραστεῖν παρὰ πρώτων Κρητῶν εἰς τοὺς Ἕλληνας παρ
65   45.|||Idem V, 28, p. I8I, C:|Οἱ δὲ Λακωνισταὶ λεγόμενοι, φησὶν ὁ Τίμαιος, ἐν τετραγώνοις χο
66   45.|||Diog. Laert. V. Epimen. I, II4:|Φησὶ δὲ Δημήτριος τινας ἱστορεῖν, ὡς λάβοι παρὰ Νυμφῶ
67   ##page##:202
68   46.|||Plutarch. Lycurg. c. 3I:|Τελευτῆσαι δὲ τὸν Λυ κοῦργον οἱ μὲν ἐν Κίῤῥα λέγουσιν· Ἀπόλλ
69   47.|||Idem ibid. c. I: De tempore quo vixerit Lycurgus haud liquet.|Οἱ μὲν γὰρ Ἰφίτῳ συνακμ
70   ##book##:LIBER III
71   48.|||Athenaeus VI, 2I, p. 272, B:|Κἀν τῇ τρίτῃ δὲ τῶν Ἱστοριῶν ὁ Ἐπιτίμαιος ἔφη, οὕτως εὐδ
72   49.|||Strab. XIII, p. 896, A:|Τίμαιον ψεύσασθαί φησιν ὁ Δημήτριος ἱστοροῦντα ἐκ τῶν λίθων τ
73   50.|||Schol. Pindar. Ol. XIII, 29:|Ὁ ἀετὸς οἰωνῶν βασιλεύς ἐστιν ὁ ἐπὶ τῶν ἱερῶν τιθέμενος.
74   51.|||Folyb. XII, 4, d. Exc. Vat.:|Φησὶ τοιγαροῦν τὴν Ἀρέθουσαν κρήνην τὴν ἐν ταῖς Συρακούσα
75   ##page##:203
76   52.|||Strabo VI, p. 270:|Ἡ δ᾽ ὀρτυγία συνάπτει γεφύρᾳ πρὸς τὴν ἤπειρον (suppl. Πρόσγειος) ο
77   53.|||Schol. Apollon. Rhod. IV, 12I6:|Τίμαιός φησι, μετὰ ἔτη ἑξακόσια τῶν Τρωικῶν Χεροικράτ
78   54.|||Idem IV, 983:|Ἡ Κέρκυρα πρότερον μὲν Δρεπάνη ἐκαλεῖτο, εἶτα Σχερία· Ἀποδίδωσι δὲ τὴν ῾
79   ##book##:LIBER VI
80   55.|||Polyb. XII, 28, Excerpt. Antiq. et Vat. Timaeus de comparandis sibi praesidiis histor
81   ##page##:204
82   56.|||Suidas:|Καλλικύριοι. Οἱ ἀντὶ τῶν Γεωμόρων ἐν Συρακούσαις γενόμενοι, πολλοί τινες τὸ π
```

Figure 4.8. FHG I 193–196: structured output 1

```
 1    ##type##:fragment
 2    ##volume##:Volumen primum
 3    ##author##:TIMAEUS
 4    ##section##:TIMAEI FRAGMENTA
 5    ##work##:
 6    ##work_section##:ITALICA ET SICULA
 7    ##book##:LIBER I
 8    1.|||Trinacria vocatur Sicilia secundum Timaeum, quod tria habet promontoria.
 9    1.|||
10    2.|||De Sicanis, primis Siciliae incolis, quum scriptores nonnulli sententiis varient, ut b
11    3.|||Atabyrum, mons Rhodi, de quo Rhianus libro sexto Messeniacorum mentionem facit. Gentil
12    4.|||Scribit Timaeus in Rebus Siculis: In Sicilia erat Daphnis, Mercurii filius, fistulis c
13    5.|||Planctae (scopuli errantes) in freto Siculo sunt, ut dicunt Timaeus et Pisistratus Lip
14    6.|||Non pauci, tum veterum, tum etiam recentium, inter quos et Timaeus est, scriptorum per
15    7.|||Timonax libro primo Rerum Sicularum in Colchis dicit Iasonem Medeam duxisse ab Aeeta e
16    8.|||Timaeo auctore Medeae nuptiae in Corcyra celebratae sunt. Dionysius vero Milesius libr
17    9.|||Circaeum locus est vel campus Colchidis a Circe Aeetae sorore nominatus. Non potest ab
18    10.|||Hercules a Tiberi profectus et maritimos Italiae, quae nunc quidem vocatur, tractus p
19    11.|||Hercules qua arctissimum est mare delatus boves transjecit in Siciliam, ipse vero app
20    12.|||
21    13.|||Postquam Troja capta erat, Diomedes lapides e muro Trojae in navem suam conjecit ad p
22    14.|||Dauniorum mulieres vestitum habent nigrum, vultum rufo colore tingunt, ut ait Timaeus
23    15.|||Solent Daunii, Calabri nempe, in pellibus ovinis in sepulcro Podalirii dormire et per
24    16.|||Atque Timaeus etiam de Pithecusis tradit veteres multa fidem excedentia perhibuisse.
25    17.|||Hoc Timaeus mendacium esse putat : nam plurima eorum quae apud eum versari solerent b
26    18.|||Timaeus Historiarum libro primo ait, apud Etruscos famulas etiam, priusquam adultae s
27    18.|||Apud Etruscos, supra modum luxuriae et mollitiei deditos famulas nudas ministrare vir
28    19.|||
29    20.|||De Penatium habitu et forma Timaeus historicus in hunc modum scribit: sacra, quae in
30    21.|||De priscis igitur Romae aedificationibus haec quae jam sunt dicta sufficere puto. Pos
31    21.|||Timaeus olim et Callias dixerunt, Romam esse conditam circa Olymp. I.
32    22.|||
33    23.|||Thiosso. Hanc dicit Timaeus Phoenicum lingua Helissam appellatam sororem esse Pygmali
34    24.|||Timaeum jure pronuntiet aliquis non solum imperiitum rerum Africae, sed etiam puerili
35    25.|||Stellas, quaelocum habent in fronte Tauri, Hyades aiunt vocari; quae autem in altera
36    ##book##:LIBER II
37    26.|||Ut in rebus Africae levitatem suam prodidit, sic etiam in iis, quae ad Corsicam nomin
38    27.|||
39    28.|||Sardinia insula prope columnas Herculis. Hanc incolunt etiam Carthaginienses. Proveni
40    29.|||Sardanius risus, id est, simulatus. Eum autem sic dictum esse aiunt a σεσηρέναι, quod
41    30.|||Quidam post reditum e bello Trojano Gymnasias insula ab iis ferunt occupatas. Harum q
42    31.|||Gymnasiae sunt insulae circa Tyrrheniam. Memorat eas etiam Artemidorus. Timaeus vero
43    32.|||
44    33.|||
45    34.|||
46    35.|||
47    36.|||De causis aestus maris, cap. XVII. Aristoteles et Heraclitus eum a sole fieri aiunt.
48    37.|||Galatia nomen habet, ut Timaeus dicit, a Galato, Cyclopis et Galateae filio.
49    38.|||De Rhodani ostiis Polybius Timaeum reprehendit, non, ut ille, quinque, sed duo esse a
50    39.|||Massalia, urbs Ligustica, juxta Celticam, colonia Phocaeensium, auctore Hecataeo. Per
51    40.|||Finitima est Massalia, urbs maxima, colonia Phocaeensium qui in Liguria eam consideru
52    41.|||Cetera quae de Pado a Graecis sunt prodita, narrationem inquam de Phaethonte et ejus
53    42.|||Sequifur magna Chersonesus Hyllica, Peloponneso fere aequalis. In qua quindecim urbes
54    43.|||Argyrini, gens Epirotica, auctoribus Timaeo et Theone. Hujus cuique Lycophron meminit
55    44.|||Puerorum amor a Cretensibus primis ad Graecos venit, ut narrat Timaeus.
56    44.|||Laconistae qui dicuntur, referente Timaeo, in choris quadratis canebant.
57    45.|||Demetrius dicit, tradere nonnullos, Epimenidem accepisse a nymphis cibum eumque serva
58    46.|||Exstinctum Lycurgum alii Cirrhae affirmant; Apollothemis, deportatum Elin; Timaeus et
59    47.|||Quidam, Lycurgum Iphiti aequalem et socium in digerendis festis Olympiacis fuisse per
60    ##book##:LIBER III
61    48.|||Idem Epitimaeus tertio Historiarum libro dixerat, ita opulentam fuisse Corinthiorum c
62    49.|||Mendacii accusat Timaeum Demetrius, quod ille perhibuerit, Periandrum ex Iliacis lapi
63    50.|||Timaeus etiam fastigium triangulare in fronte et postico templorum, cui aquila Jovis
64    51.|||Ait igitur fontem Arethusae, qui Syracusis est, origines inde usque a Peloponneso tra
65    52.|||Ortygia cum continenti vicina ponte conjungitur. Ea insula fontem habet Arethusam, qu
66    53.|||Timaeus ait, annis sexcentis post bellum Troicum Chersicratem Bacchiadam sive in exil
67    54.|||Corcyra prius vocabatur Drepana, deinde Scheria, cujus denominationis rationem reddit
68    ##book##:LIBER VI
69    55.|||Rem autem ita se habere, confitentem ipsum Timaeum exhibere facile est. Nam is in lib
70    56.|||Callicyrii, Geomoris expulsis, locum illorum Syracusis occuparunt. Ingenti erant mult
71    57.|||Itaque etiam quo tempore Graeciam cum exercitu invasit Persa, ut et Theopompus narrat
72    ##book##:LIBER VII
73    58.|||De Smindyrida Sybarita, ejusque luxuria, Herodotus memorat libro sexto: «ambiturum Ag
74    59.|||Narrat de Sybaritis Timaeus, hominem quemdam Sybaritam, rus profectum aliquando, quum
75    60.|||Gestabant Sybaritae vestes ex Milesia lana confectas: ex quo etiam amicitiae inter ci
76    61.|||Multi in remedia, quae ad impediendam ebrietatem praeparant, brassicae semen adsumunt
77    62.|||Porro qui Siri habitant, quam tenuerant primum, qui e Troja venere, deinde Colophonii
78    63.|||Timaeus inter Italiae fluvios Crathin narrat crines flavos reddere.
79    64.|||Timaeus, Sicularum historiarum scriptor, narrat, quum Locrorum atque Rheginorum ager
80    65.|||Narrat Timaeus, hunc Eunomum et aristonem Rheginum aliquando Pythiis canendo concerta
81    ##book##:LIBER IX (I).
82    66.|||Ajace Locro naufragium circa Gyreas perpesso et in Tremonte Deii loco commorato, Locr
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Figure 4.9. FHG I 193–196: structured output 2

historical sources transmitted by inscriptions, manuscripts and in the form of extended excerpts. These sources, that in many cases have been collected and published for the first time in the FHG, show the importance of the work of Karl Müller in the field of Classical historiography between the 19th and the 20th century, in spite of the strong criticism expressed by Felix Jacoby toward it:[59]

FHG I

– Apollodorus Atheniensis (104–179). The text of the *Bibliotheca* of Apollodorus published by Müller is based on the reading of the archetypal manuscript *Parisinus Graecus* 2722 (R), which is compared with the edition of Christian Gottlob Heyne (1782–1783 and 1803).[60]

– **Appendix**

– *Marmor Parium* (542–555). Müller publishes only fragment A of the *Marmor Parium* (ll. 1–93) on the basis of the edition by August Boeckh (CIG 2374), because fragment B from Paros was discovered and published in 1897: see FHG I vii and 535–541. The text is followed by critical notes in the *Annotatio* (556–590). On the *Digital Marmor Parium* project, see section 4.5.

– *Marmor Rosettanum* (1–6). The Greek text of the *Rosetta Stone* is published by Jean-Antoine Letronne with his French translation: see FHG I v–viii. Also in this case the text is followed by critical notes in the *Commentaire critique, historique et archéologique* (7–42). On the *Digital Rosetta Stone* project, see section 4.6.

FHG II

– **De insidiis quae regibus structae sunt excerpta**

– Diodorus Siculus (vii–xxvi). Müller publishes *excerpta* of books VI, VII, VIII, XXX–XL of the *Historia* of Diodorus Siculus from the *Codex Escurialensis* Ω.I.11 (36324) (foll. 176r–187v) with critical notes.

– Polybius Megalopolitanus (xxvii–xxx). Müller publishes an *excerptum* of book XV of the *Historia* of Polybius from the *Codex Escurialensis* Ω.I.11 (36324) (foll. 188v–190v) with critical notes.

– Dionysius Halicarnassensis (xxxi–xlii). Müller publishes an *excerptum* of book XII of the *Historia* of Dionysius Halicarnassensis from the *Codex Escurialensis* Ω.I.11 (36324) (foll. 188r–v and 190v–196v) with critical notes.

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60   See FHG I iv–vi, where Müller includes critical notes and a list of *lectiones* accepted in the text of the FHG from the manuscript. The DFHG *Witnesses Catalog* includes references to the manuscripts consulted by Müller and, when available, adds links to external resources with further information and images: see section 4.4.2.

- **Liber tertius**
    - Heraclides Ponticus (208–224). Müller publishes all the *excerpta* of Aristoteles' *Politeiai* attributed to Heraclides with critical notes and an extended introduction, where he also describes eleven manuscripts that preserve the *excerpta* and adds quotations of their descriptions by Friedrich Wilhelm Schneidewin: *Codex Parisinus* 1657 (A), *Codex Leidensis* (B), *Codex Vaticanus* 998 (C), *Codex Parisinus* 1693 (a), *Codex Parisinus* 1694 (b), *Codex Basiliensis* F VI 29 (c), *Codex Laurentianus* LX 19 (d), *Codex Laurentianus* LXX (e), *Codex Sluiscanus* (f), *Codex Ambrosianus* C 4 (g) and *Codex Vaticanus* 1375 (p): see FHG II 197–207. For the publication of the text, Müller also relies on the *editio princeps* by Camillo Peruschi (1545).[61] Müller attributes the *excerpta* to Heraclides Ponticus, who is included in the section about Aristoteles and his disciples in FHG II (101–339). Recent scholarship attributes the *exceperta* of the *Politeiai* to Heraclides Lembus, whose fragments are published by Müller in FHG III (167–171) in a section with authors dated between 247 and 146 B.C.[62]
    - Dicaearchus Messenius (254–264). Under the title Περὶ τῶν ἐν Ἑλλάδι πόλεων Müller publishes three *excerpta* (59, 60, and 61) with critical notes that are preserved by three manuscripts which were usually attributed to Dicaearchus: *Codex Parisinus Suppl. Gr.* 443, *Codex Parisinus Graecus* 571, and the so called *Codex Gudianus*: see FHG II 227.[63] The other FHG fragments of Dicaearchus are quotations and text reuses preserved in extant sources (type `fragment`).

FHG III
- **Liber septimus**
    - Nicolaus Damascenus (348–464). Some of the *fragmenta* of Nicolaus in FHG III (frr. 3–10, 12, 14–21, 24, 27, 28, 33, 34, 36, 38, 39, 41, 43, 49–70, 99–101) are *excerpta* from the Constantinian *Excerpta de insidiis* and *Excerpta de virtutibus et vitiis* that Müller publishes with critical notes from the *Codex Escurialensis* Ω I.11 and the *Codex Turonensis* C 980.[64]
    - Memnon (526–558). Books 9–16 of the Περὶ Ἡρακλείας of Memnon of Heraclea have been transmitted as an extended summary by Photius

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61 For a description of the entire manuscript tradition of Heraclides' *Politeiai*, see Dilts (1965).
62 See Bloch (1940) and Dilts (1971) 8. This is the reason why the DFHG *Witnesses Catalog* (section 4.4.2) includes the FHG *author* Heraclides Ponticus under the *witness author* Heraclides Lembus.
63 On these manuscripts that are now considered spurious, see the commentary by Gertjan Verhasselt in FGrHist IV 1400 (Introduction § 4.17).
64 On these fragments, see now FGrHist 1054 and BNJ 90.

in the *Bibliotheca*. Müller doesn't present the epitome of Memnon as a numbered fragment, but follows the structure of other extant sources with the Latin translation in a parallel column and detailed critical notes at the bottom of the page.[65]

- **Liber octavus**
  - Phlegon Trallianus (603–604 and 608–624). Some of the FHG fragments of Phlegon Trallianus (frr. 1 and 29–64) are *excerpta* of his works from the *Codex Palatinus Graecus* 398. The other FHG fragments of Phlegon are quotations and text reuses preserved in extant sources (type `fragment`).[66]
  - Porphyrius Tyrius (689–702, 706–707, 711–717, 719–725). Müller publishes the *excerpta* of the *Chronica* of Porphyrius from Eusebius and Georgius Syncellus with the same structure of other fragments that have been classified as `extant text`, which means that the original text has a parallel column with the Latin translation and extended critical notes at the bottom of the page.[67]

FHG IV

- **Liber nonus**
  - Hesychius Milesius (146–177). FHG fr. 4 of Hesychius is the *excerptum* of the work Πάτρια Κωνσταντινουπόλεως preserved in the *Codex Palatinus Graecus* 398.[68] FHG fr. 7 is the text of a *libellus* entitled Περὶ τῶν ἐν παιδείᾳ διαλαμψάντων σοφῶν, which is preserved by a few manuscripts and originally attributed to Hesychius of Miletus. Müller publishes the text with critical notes that include parallel biographical entries from the *Suda* and other sources. After the edition by Johann Konrad Orelli (1820), which was consulted by Müller (FHG IV 143–145), the *libellus* was edited by Johannes Flach (*Hesychii Milesii qui fertur De viris illustribus librum*, 1880), who considered the text spurious and two years later published a complete reconstruction of the original work of Hesychius (*Hesychii Milesii Onomatologi quae supersunt*, 1882).[69]
  - Joannes Epiphaniensis (273–276). The FHG *excerptum* of the *Historiae* of Joannes Epiphaniensis is preserved in the *Codex Vaticanus Graecus* 1065. Müller relies on the text edited by Karl Benedikt Hase at the end of the edition of the *History* of Leo the Deacon (1819, 171–176):

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65 FGrHist 434 and BNJ 434 present the text as T1 and F1.
66 On the *excerpta* of this author, see now BNJ 257.
67 On the historical works of Porphyrius, see now BNJ 260.
68 See now BNJ 390 F7.
69 On this work, which is also known as Ὀνοματολόγος (cf. *Suda* [H 611] s.v. Ἡσύχιος Μιλήσιος), see Kaldellis (2005) and Costa (2010).

see FHG IV 272.

- **Appendix ad librum nonum**
  - Joannes Antiochenus (538–622). Müller publishes the *excerpta* of Joannes Antiochenus from the *Excerpta Constantiniana*, the *Excerpta Salmasiana*, and from passages of the *Codex Parisinus Graecus* 1630. Other fragments are text reuses from the *Suda*, Tzetzes, and Georgius Codinus. The *excerpta* are published without Latin translations and with extended critical notes at the bottom of the page. In FHG V (*pars prior* 27–39) Müller added other *excerpta* of Joannes Antiochenus from the *Codex Escurialensis* Ω.I.11.[70]

FHG V

The first part of **FHG V (pars prior)** collects Greek authors whose works are published by Müller on the basis of recently discovered manuscripts.

- Aristodemus (1–20). The *excerptum* of Aristodemus is published by Müller with extended critical notes from the *Codex Parisinus Suppl. Gr.* 607 (foll. 83v–87v). Characteristics and content of the manuscript are extensively described in the *prolegomena* of FHG V (vii–xiv).[71]
- Eusebius (21–23). The two *excerpta* of Eusebius are published by Müller with critical notes from different *folia* of the *Codex Parisinus Suppl. Gr.* 607 (foll. 17, 103v).[72]
- Priscus (24–26). The two *excerpta* of Priscus are published by Müller with critical notes from the *Codex Parisinus Suppl. Gr.* 607 (foll. 93v–94v).
- Joannes Antiochenus (27–39). These *excerpta* are from the *Codex Escurialensis* Ω.I.11.[73]
- Joannes Malala (38–39). Müller publishes an *excerptum* of the *Chronographia* of Joannes Malala found in the *Codex Escurialensis* Ω.I.11 after the text of Joannes Antiochenus.[74]
- Critobulus (52–161). The five books of *De rebus gestis Mechemetis* have been

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[70] For a new edition of Joannes Antiochenus, see Roberto (2005), part. clxix–clxx on the important contribution of Müller, who produced the first edition of the fragments of Joannes Antiochenus in the fourth volume of the FHG.

[71] On the identity of the author of the *excerptum*, see FGrHist 104, BNJ 104, Schubert (2014), and Liuzzo (2015).

[72] On the identity of Eusebius, who has been variously identified with Eusebius of Caesarea and Eusebius of Nantes, see BNJ 101.

[73] See above for the description of the fragments of Joannes Antiochenus published in FHG IV.

[74] On the chronicle of John Malalas, see Jeffreys/Croke et al. (1990), Thurn (2000), Beaucamp/Agusta-Boularot et al. (2004), Agusta-Boularot/Beaucamp et al. (2006), Meier/Christine et al. (2016), Borsch/Gengler et al. (2019). A project for producing an online commentary of the chronicle of Johannes Malalas with philological and historical notes is now ongoing at the Heidelberger Academy of Sciences and Humanities under the direction of Mischa Meier: see https://www.hadw-bw.de/forschung/forschungsstelle/malalas-kommentar.

published by Müller with critical notes from the *Codex Constantinopolitanus Seragliensis* G.İ. 3. The text of the *Epistula* is also known from the *Codex Tischendorf*. Both manuscripts are described in the *prolegomena* of FHG V (xiv–xvi).[75]

– Photius (162–173). Müller publishes the text of two *Homiliae* of Photius about the Rus' siege of Constantinopolis (865 CE) from the *Codex Athous* (Monê Ibêrôn), which is described in the *prolegomena* of FHG V (xvi) relying on the edition of August Nauck (1867, 201–232).

– Anonymus (174–184). Müller publishes the text of chapter XLII (*pars media*) of the *Anonymi Periplus Ponti Euxini* from the *Codex Londiniensis Musei Britannici* 19391. The manuscript is described in the *prolegomena* of FHG V (xvi–xix). The other two parts of the *Periplus*, which are known from the *Codex Vaticanus Graecus* 143 and the *Codex Palatinus Graecus* 398, are published by Müller in the *Geographi Graeci Minores* (I 402–423): cf. FHG V, xix–xx.[76]

– Dionysius Byzantius (188–190). Müller publishes the last part of the text of the *Anaplus Bospori* of Dionysius Byzantius from the *Codex Londiniensis Musei Britannici* 19391. The author is already published in the *Geographi Graeci Minores* (II 1–101) with the surviving Latin paraphrase by Petrus Gyllius.

The second part of **FHG V (pars altera)** has been curated by Victor Langlois and collects French translations of Armenian historical sources that derive from Greek and Syriac works. This section of FHG V is part of a bigger project of Langlois, who published two volumes of a collection of historians of Armenia thanks to the support of the editor Firmin Didot.[77] The first volume of this collection corresponds to the second part of the fifth volume of the *Fragmenta Historicorum Graecorum*, to which was added as a "complément" (FHG V, *pars altera* vii). Greek texts published in this part of the FHG were reviewed by Johann Friedrich Dübner. The project of Langlois and the idea of including part of it in the new collection of the FHG have to be understood as a consequence of the great impulse given to the Armenian studies in Europe by the move of the congregation of the Mekhitarists to the island of Saint Lazarus in Venice in 1715 (FHG V, *pars altera* v). The goal of Langlois was to publish authors who were for the most part still unedited and never translated into a European language.[78] Langlois individuates historians who originally wrote in Syriac and/or Greek and whose works have been preserved through their translations into Armenian (1 and 2), and lost

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75 For a new edition of the text of Michael Critobulus, see Reinsch (1983).
76 For a new edition of the *Anonymi Periplus Ponti Euxini*, see FGrHist 2037.
77 Langlois (1867) and Langlois (1869).
78 On recent studies about Armenian and Syriac sources, see Calzolari (2014) and King (2018) with further bibliography.

Greek historians known through references and extracts in Armenian authors (3).[79] The first two groups (1 and 2) include the following authors (1: *Historiens grecs traduit en arménien*; 2: *Historiens syriens traduit en arménien*):

- Le Pseudo-Bardesane. Langlois publishes the French translation of the surviving *Book of the Laws of Countries* (*Le livre de la loi des contreées*) by Bardaisan, which is preserved in a Syriac manuscript of the British Library (Add MS 14658). Langlois attributes this work to a disciple of Bardaisan (le Pseudo-Bardesane: FHG V, *parsa altera* 73–94). The French translation is based on the Syriac text and Langlois relies on the edition by Cureton (1855), which is now available online at http://syri.ac/bardaisan and which also contains a small fragment of a work on the revolution of the stars that Langlois publishes with the title *Traité sur les révolutions des astres* (95).[80]
- Agathange. The French translation of the surviving Armenian version of the *History* of Agathangelos is published for the first time by Langlois, who also adds the Greek version of it with the Latin translation by P. Johannes Stilting: see FHG V, *pars altera* 105–194. The translation is based on the Mekhitarist edition published in Venice in 1835 (FHG V, *pars altera* 101–102).[81]
- Faustus de Byzance. Jean-Baptiste Émine publishes the first French translation of the Armenian version of the work of Faustus of Byzantium considering it what remains of the lost original Greek version: see FHG V, *pars altera* 209–310. The French title is *Bibliothèque historique* and the transla-

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79 See FHG V, *pars altera* vii (*préface*) and ix–xxxi (*discours préliminaire*), where Langlois discusses the strong influence of the Syriac and Greek languages on Armenian translations. On the importance of Syriac literature for the transmission of Greek texts, see Riedel (2012).

80 On the philosophical background of the *Book of the Laws of Countries*, cf. Riedel (2012) 799. For a dissertation on computer-assisted linguistic analysis of this work of Bardaisan, see Bakker (2011). Bardaisan is registered in the catalog of authors (*A Guide to Syriac Authors*) of the digital project *Syriaca.org* with the following URI: http://syriaca.org/person/3 (Bardaisan). See also the CLARIAH project LyncSyr (*Linking Syriac Data*) for linguistic data processing of the *Book of the Laws of the Countries* in order to explore how the Biblical heritage and Hellenistic culture interact in the oldest documents of Syriac Christianity: https://github.com/ETCBC/linksyr. On Bardaisan see now Possekel (2018) 314–316. For more resources, see the *Comprehensive Bibliography on Syriac Christianity* at http://www.csc.org.il. Other evidence collected in FHG V is constituted by Greek, Latin, and Armenian sources about Bardaisan (*testimonia* and *fragmenta*).

81 On the Greek translation of the original Armenian version of the text, see Lafontaine (1973), which is also the edition of the text published in the online *Thesaurus Linguae Graecae* (*Historia Armeniae (versio Graeca)*: tlg2878.001). On recent research about Agathangelos in particular and on Armenian historiography in general, see Hacikyan/Basmajian et al. (2000) 117–148 and Thomson (2014). Langlois also publishes the French translation of an Armenian excerpt (*extrait*) of a history of the Armenia of the origins preserved in a work attributed to Sebeos (*Le Pseudo-Agathange. Histoire ancienne de l'Arménie* 195–200): on this text see Hewson (1975).

tion has been performed on the edition published in Venice in 1832.[82]

- – Léroubna d'Édesse. Jean-Raphaël Émine publishes with critical notes the first French translation of an Armenian text preserving the *Letter of Abgar* (Bibl. Imp. Paris arm. 88 – Martyrologe, foll. 112v–126v). Victor Langlois accepts the attribution of the text to Lerubna of Edessa and considers it what remains of a lost original Syriac version: see FHG V, *pars altera* 315–316 and 317–325.
- – Zénob de Glag and Jean Mamigonien. Jean-Raphaël Émine publishes also a French translation of the Armenian version of the *History of Taron* of Zenob of Glak and the first French translation of its continuation by John Mamikonyan: see FHG V, *pars altera* 337–355 and 361–382. The translations have been performed on two critical editions donated to Venice by the Mekhitarists of Saint Lazarus (FHG V, *pars altera* 336 and 360).[83]

The third group (3) includes the following authors (3: *Fragments d'historiens grecs perdu, conservés dans les œuvres des historiens arméniens*):

- – Moïse de Khorène. Victor Langlois publishes the French translation of excerpts of the Armenian text of the *History of Armenia* of Moses of Khoren where the author refers to Greek authors consulted for his own historical research: see FHG V, *pars altera* 386–398. Extracts of the work of Moses are also published at 13–53 under a section about Mar Apas Catina, who is identified by Langlois as author of a work extensilvely summarized by Moses. Langlois individuates 24 Greek historians whose fragments are preserved in the work of Moses (FHG V, *pars altera* 386: "Bérose, Alexandre Polyhistor, Abydène, Josèphe, Manéthon, Céphalion, S. Épiphane de Constance, Gorgias? (Korki), Panan, David, Olympiodore, Jules l'Africain, Hippolyte, Polycrate, Évagoras, Camadrus, Phlégon de Tralles, Olympius d'Ani, Ariston de Pella, Paléphate, Porphyre, Philémon, Khorohpoud (*vulgo* Éléazar), Firmilien de Césarée").[84]

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82   A Master dissertation (MA) on Faustus of Byzantium has been written and defended by Uta Koschmieder under my supervision at the Martin-Luther University of Halle-Wittenberg in 2016 as part of a collaboration with the University of Leipzig: Koschmieder (2016). For a new English translation with commentary of the original Armenian text of Faustus, see Garsoïan (1989), who entitles it *The Epic Histories* and shows that the work was originally written in Armenian and not in Greek. On the necessity of a new critical edition of this author, see Thomson (2014) 305.

83   On Zenob the Glak, see Kennedy (1904).

84   On Moses of Khoren, see Hacikyan/Basmajian et al. (2000) 305–340.

- Le Pseudo-Callisthènes. Langlois includes also a short commentary to the Armenian translation of the Greek history of Alexander by Pseudo-Callisthenes referring to the Mekhitarist edition published in Venice in 1842: see FHG V, *pars altera* 399.[85]
- Gregoire Magistros Duc de la Mesopotamie. Langlois publishes the French translation of a short extract of a letter of Grigor Magistros where he refers to his own translations of Greek and Syriac authors: see FHG V, *pars altera* 401–403. Langlois mentions the fact that the works of Grigor were preserved in the library of the Mekhitarists in Venice and in other collections and still needed to be published.[86]
- Saint Epiphane, évêque de Salamine en Chypre. Langlois publishes the French translation of two texts that preserve the Armenian and the Syriac version of two fragments of the *Treatise on Weights and Measures* (Περὶ μέτρων καὶ σταθμῶν) of Epiphanius of Salamis: see FHG V, *pars altera* 405–408.[87]

4.3.1.2 Visualization

The DFHG is first of all a structured database of the contents of the *Fragmenta Historicorum Graecorum* that can be exported to different formats.[88] Experiments have been carried out to navigate the data of the collection in dynamic HTML pages.[89] As a result, the DFHG appears as an Ajax web page automatically generated by a PHP script that queries the SQL database of the project.[90] Using advanced techniques like asynchronous loading and AJAX, it is possible to load, visualize, and navigate the entire content of the FHG in one single HTML page in order to facilitate the usability of a very large collection.[91] AJAX web pages use client computation capabilities to render the page and provide the majority of

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85 On the Armenian Pseudo-Callisthenes see Traina (2016), who urges the need to consider it on the same level of the Greek versions and as "an authoritative *testimonium*, extremely useful for the *constitutio textus* of the *recensio vetusta*."

86 On the numerous and significant references to Greek authors in the letters of Grigor Magistros, see now Muradyan (2013).

87 The two texts come from two manuscripts of the Bibliothèque Nationale de France (arm. 93bis, foll. 9v–10v; syr. 5, foll. 88v–89r).

88 For the outputs of the DFHG, see sections 4.3.6 and 4.3.7.

89 On digital editions as interfaces, see Bleier/Bürgermeister et al. (2018) and cf. Jannidis/Kohle et al. (2017).

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91 Users have the possibility to load and navigate the entire collection of the FHG in one page (37 MB) or to select one of the five volumes: FHG I (7.4 MB), FHG II (6.4 MB), FHG III (7.8 MB), FHG IV (7.4 MB), FHG V–1 (2.9 MB) and V–2 (3.9 MB). On the amount of data stored in the DFHG database, see section 4.3.

the services without reloading the web page and minimizing data transfer effort. This computational delegation allows the DFHG to avoid the usage of an expensive server infrastructure. The life cycle of each DFHG page is constituted by the asynchronous download of many minimized HTML codes that are generated (server-side) by PHP scripts querying the DFHG database. These HTML codes are then unpacked and displayed in the correct order (client-side) by JavaScript functions. DFHG content is downloaded asynchronously by FHG authors, so that all HTML codes representing FHG author sections are requested at the same time, become asynchronously available to the client, and are placed in the correct position of the page thanks to JavaScript functions.

Figure 4.10. Workshop *World in Pieces*: the DFHG project (photo: M. Berti)

The goal of the visualization is not to replicate the printed edition of the FHG in a digital environment, but to improve its accessibility by offering services that are not available in the printed format. Examples are the *slide in/out navigation menu*, which represents the whole structure of the FHG with links to each of its sections down to the fragment level, and the *main page*, which arranges in parallel columns all the elements of the sources edited and collected in the FHG.

This visualization provides scholars with a possible solution for accessing and navigating digital editions of historical fragmentary texts that intend to follow the traditional model of collecting quotations and text reuses by extracting chunks of texts (*fragmenta*) from their context. According to this model, a digital collection of textual fragments (*fragmenta*) becomes a structured database where it is possible to store source texts that preserve quotations and reuses of other texts.

In this regard, the *Digital Fragmenta Historicorum Graecorum* project has been also presented in an exhibition as part of a workshop entitled *The World in Pieces: Fragments and the Fragmentary*, that was organized by Matthew Payne and

Antje Wessels at the University Library of Leiden on January 23–24, 2020.[92] On that occasion, the DFHG project was displayed on a tablet together with one of the volumes of the *Fragmenta Historicorum Graecorum*, so that visitors could interact with the tablet, compare the two resources, and see the differences between the printed and the digital version of the collection. Figure 4.10 shows a picture taken at the exhibition where it was possible to see the volume of FHG II opened at pages 362–363 together with the tablet that displayed the corresponding section of the DFHG *main page* about Demetrius Phalereus.[93]

4.3.2 Digger

▼ The DFHG *Digger* is a tool for browsing authors and works collected in the *Fragmenta Historicorum Graecorum*. This tool filters FHG data according to authors, works, work sections and book numbers.[94] By typing and selecting through a live search, users can display the desired part of the collection.

Search Fields are: Author (e.g., Antiochus); Work (e.g., *Atthis*); Work Section (e.g., ΑΘΗΝΑΙΩΝ: work section of Aristoteles' ΠΟΛΙΤΕΙΑΙ); Book number (e.g., E LIBRO VICESIMO TERTIO: book 23 of the *Historiae* of Duris Samius and of Posidonius Apamensis). It is possible to combine filters using logical AND/OR expressions to get a more precise selection. For example: CHARON (author) AND ΠΕΡΣΙΚΑ (work); DEMO (author) OR ISTER (author).

For each query the output displays introductions to FHG authors and fragments arranged by authors and works within FHG volumes and subvolumes. It is also possible to search DFHG authors whose sections in the FHG don't include numbered fragments but only commentaries, as for example Cadmus Milesius and Mnesiptolemus.[95] As already mentioned in the previous sections, Greek and Latin forms of authors, works, work sections and book numbers are those originally used by the editors in the printed edition of the FHG.

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92 Other objects collected in the exhibition were manuscripts, papyri, and waxed tablets that were chosen to show different examples of physical fragments of historical documents and text reuses preserved on them.

93 http://www.dfhg-project.org/DFHG/digger.php?what[]=author|DEMETRIUS+PHALEREUS&onoffswitch=on

94 http://www.dfhg-project.org/DFHG/digger.php

95 On these authors, see p. 185.

4.3.3 Search

🔍 DFHG contents (introductions, fragments, translations, commentaries and source texts) are searchable in two different ways: 1) by holding down the SHIFT-key when highlighting words with the mouse in the DFHG *main page* of the entire collection or of a single volume; 2) by searching words directly in the *search tool*.[96] The search is performed on fragments, translations, commentaries and source texts. Results show the number of occurrences in each DFHG author and are organized by authors and works, and searched words are highlighted in the texts of the DFHG. When available, results display also inflected forms and lemmata through *Morpheus*, the *Suda On Line*, and the *Liddell-Scott Lexicon in the CITE Architecture*.[97]

4.3.4 Integration

♉ One of the main goals of the DFHG project is to integrate the *Fragmenta Historicorum Graecorum* with internal and external resources such as textual collections, authority lists, indices, dictionaries, lexica and gazetteers. These resources are available through the DFHG *main page* and the DFHG *search tool*.

Promoting the usage of a network of interconnected resources developed and maintained by different research groups and avoiding the creation of the same functionalities inside the DFHG project are a strong encouragement to rethink the way technical infrustructures in the digital humanities are growing. The goal is to support service interaction instead of raw data publication, so that the community doesn't have to loose time recoding services that are already available and can isolate useless monolythic client resources. The DFHG *main page* is currently connected to the printed edition of the FHG available through *Google Books*, to the 8427 entries of the *Index Nominum et Rerum* (FHG I), to the 249 entries of the *Index Marmoris Rosettani* (FHG I), and to the *OpenNLP POSTagger for Ancient Greek*. The first three resources allow users to compare the digital version and the printed edition of the FHG by visualizing the original pages of the volumes and by consulting the entries of each source text that have been collected by Karl Müller and Jean-Antoine Letronne in the two indices of FHG I. The digital versions of these indices provide links to other entries and their contexts.[98] The *OpenNLP POSTagger for Ancient Greek* is trained on the *Ancient Greek Dependency Treebank 2.0* and automatically parses the text of each Greek source of the FHG

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96   http://www.dfhg-project.org/DFHG/search.php
97   On these resources, see section 4.3.4.
98   On *Google Books* and the digital version of the indices of FHG I, see pp. 142 and 146.

in order to obtain the corresponding Part-of-Speech (POS) tag of each token.[99] These resources can be consulted by clicking the page number and the two icons 🔖 and 🏷 under each fragment number in the DFHG *main page*, as it is visible in the example of figure 4.11.

The DFHG *search tool* is currently connected to the corresponding fragment in the DFHG *main page*, to *Morpheus*, to the *Suda On Line*, and to the *Liddell-Scott Lexicon in the CITE Architecture*. As described at p. 165, the DFHG *search tool* displays results by showing the number of occurrences in each DFHG author and by visualizing fragments and passages according to authors and works. Links to each fragment and to each source text allow users to move from the *search tool* to the *main page* in order to visualize each result in its relevant section within the DFHG collection.
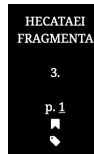
Figure 4.11. DFHG integration

Morpheus is the open parsing and lemmatising tool of the *Perseus Project* that returns the lemma (or multiple possible lemmata) of each token and a full morphological breakdown of the form.[100] The project provides a morphology service API to access the resource. Due to the amount of data, the DFHG doesn't interrogate it on the fly, but has created a cached thesaurus of *Morpheus'* entries in its database in order to speed up the morphological analysis process which is available in the *search tool*. Given the complexities of an inflected language like ancient Greek and the fact that *Perseus* doesn't cover the entire corpus of Greek literature, *Morpheus* still needs to perform additions, corrections, and disambiguations of its entries.

Other projects have been addressing this task in the last years, as for example the *Thesaurus Linguae Graecae* (TLG) and *Logeion*. As reported on the TLG website, "the *TLG Lemmatization Project Work* on lemmatization began in 2003 and benefited from access to software known as *Morpheus* developed by the *Perseus Project*. *Morpheus* was designed to deal effectively with a relatively narrow, well-documented cross section of the Greek language, i.e. the classical canon, meaning Epic and Attic Greek with some Doric, Ionic, and Koine forms. The TLG corpus encompasses the totality of Greek literature, including Early Modern Greek, and Byzantine texts. As a result, lemmatization of the TLG

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99 On this resource see Celano/Crane et al. (2016) and Celano (2019).
100 Crane (1991); Reggiani (2017) 201 ff.; Celano (2018); Burns (2019) 166; Celano (2019).

corpus required a different philosophy and a significantly more complex architecture, which combines lexical and morphological databases, and extensive programming in order to increase parses and achieve higher and more accurate form recognition. At the time of its first release in December 2006, the TLG lemmatizer recognized approximately 88% of the unique wordforms in the TLG corpus."[101] According to the same web page, at the end of February 2019 automatic lemma recognition of the TLG was "up to 98.362%." Inflected forms of the TLG can be automatically linked through their URLs, but they require an individual or institutional subscription in order to be accessed and consulted for getting the corresponding lemmata and morphologycal analyses. Therefore, TLG data can't be directly accessed and exported to be used to perform automatic lemmatization and morphological analysis of other textual collections.

Logeion was developed "to provide simultaneous lookup of entries in the many reference works that make up the Perseus Classical collection." The project has been developing morphological analysis tools and ingests data from different dictionaries of ancient Greek. The resource is open, but doesn't provide an API to access its database and lemmata are only available through a web interface.[102] Future work of the DFHG project will query data from the *Lemmatized Ancient Greek XML* corpus that includes, beside *Perseus*, *Open Greek and Latin* (OGL) texts and is based not only on *Morpheus* but also on *PerseusUnderPhiloLogic*.[103]

Suda On Line (SOL) is a collaborative online project that offers English translations and annotations of the more than 31,000 entries of the Byzantine lexicon *Suda*.[104] The integration of this resource with the DFHG is due to the importance of the *Suda* as a source of quotations and text reuses of lost historical texts.[105] Thanks to the automatic lemmatization of the Greek texts of the DFHG and to a complete list of *Suda*'s headwords with corresponding URLs of the *Suda On Line*, the DFHG *search tool* is able to automatically detect if lemmata of inflected forms of FHG texts correspond to *Suda*'s entries.[106] An example are the 19 FHG occurrences of the form Ἑκαταίῳ, whose lemma Ἑκαταῖος correponds to two different entries in the *Suda* about Hecataeus of Abdera and

101 See http://stephanus.tlg.uci.edu/news.php (*The TLG Lemmatization Project*).
102 https://logeion.uchicago.edu/about
103 See https://github.com/gcelano/LemmatizedAncientGreekXML and http://perseus.uchicago.edu/. Other resources for performing lemmatization and morphological analyses of ancient Greek are *The Classical Language Toolkit* (CLTK) and *Diorisis*: Burns (2019) 166–168; Vatri/McGillivray (2018); Vatri/McGillivray (2020).
104 See http://www.stoa.org/sol/ and Mahoney (2009).
105 Cf. Vanotti (2010).
106 The list has been generated as part of the projects of the Duke Collaboratory for Classics Computing (DC3): https://github.com/dcthree.

Hecataeus of Miletus, who are both authors collected in the FHG:[107] E 359 s.v. Ἑκαταῖος (http://www.stoa.org/sol-entries/epsilon/359) and E 360 s.v. Ἑκαταῖος (http://www.stoa.org/sol-entries/epsilon/360). In this case the two entries are quoted in the FHG in the introductions to Hecataeus (FHG I IX notes 1 and 3) and to Hecataeus Abderita (FHG II 384), but not as separate *testimonia* or *fragmenta*.[108] Other examples are the 26 FHG occurrences of the form Τίμαιον, whose lemma Τίμαιος corresponds to three entries in the *Suda*: T 600 s.v. Τίμαιος (http://www.stoa.org/sol-entries/epsilon/600), T 601 s.v. Τίμαιος (http://www.stoa.org/sol-entries/epsilon/601), and T 602 s.v. Τίμαιος (http://www.stoa.org/sol-entries/epsilon/602). Part of the text of the entries 600 and 602 is quoted in the introduction to Timaeus (FHG I, xlix n. 1) in a discussion about the identification of Timaeus Tauromenita.[109]

Future developments of the DFHG will also include data from *Harpokration On Line* (HOL) and *Photios On Line* (PhoOL), as soon as these projects will have completed the translation of the entries of the *Lexicon of the Ten Orators* of Harpocration and of the *Lexicon* of Photius.[110] The integration with all these resources is important not only because these encyclopedias and lexica preserve many references to historical texts, but also because the integration itself is fundamental to improve data and expand interchanges among collections in the spirit of *Linked Open Data* (LOD).

The *Liddell-Scott Lexicon in the CITE Architecture* is a resource that has been recently implemented to provide access to the 116,502 entries of the LSJ as a CITE Collection with the data for each entry formatted in Markdown.[111] Thanks to the lemmatization of the DFHG texts performed with *Morpheus*, the DFHG *search tool* is able to detect if lemmata of FHG inflected forms correspond to LSJ entries. An example are the 7 FHG occurrences of the inflected form συγγραφῇ, which corresponds to three lemmata: συγγραφεύς,[112] συγγραφή,[113] and συγγράφω.[114] These URNs are expressed according to the *CITE Architecture* and provide unique

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107 In this example and in the following one the number of occurrences takes into account only the occurrences in the ancient sources of the FHG and not the Greek forms cited in the commentaries of the FHG, that are included in the results of the DFHG *search tool*. This is the reason why a query in the DFHG gives a different number.

108 Both entries are *testimonia* in FGrHist (BNJ) 1 and 264.

109 Entry 602 is a *testimonium* in FGrHist (BNJ) 566.

110 See https://github.com/dcthree/harpokration and https://github.com/dcthree/photios.

111 The resource is available at http://folio2.furman.edu/lsj/. For a technical discussion about its implementation within the *CITE Architecture*, see Blackwell/Smith (2019). The digital version of the *LSJ* is the 1940 edition of the *Greek–English Lexicon* of Henry George Liddell and Robert Scott revised and augmented by Henry Stuart Jones. On various aspects of the complex history and methodology of the LSJ, see now Stray/Clarke et al. (2019).

112 urn:cite2:hmt:lsj.markdown:n97547

113 urn:cite2:hmt:lsj.markdown:n97548

114 urn:cite2:hmt:lsj.markdown:n97555

identifiers for the three lemmata of συγγραφῇ.[115] A URL prefix make these URNs web resolvable and linkable through the DFHG *search tool.*

The reason for integrating the database of the DFHG with all these resources dipends on different questions: 1) the FHG is a rich collection of historical sources about many different aspects of Classical antiquity, whose language is constituted by significant Greek words that still need to be annotated and lemmatized;[116] 2) the integration with dictionaries, lexica, and encyclopedias allows to disambiguate and understand the language of the sources of the FHG; 3) on the other side, the language of the FHG permits to enrich external linguistic resources that still miss many ancient Greek words; 4) from a computational point of view, these experiments are also fundamental to improve standardization and portability in accordance with the principles of *Linked Open Data* about the ancient world.[117]

4.3.5 Data Citation

</> Data citation is a computational problem that concerns many fields including Digital Classical Philology.[118] As discussed in section 3.2, the community of Digital Classics has been addressing the problem and one solution is the *CITE Architecture*, which provides stable, unique, and canonical identifiers for historical resources.

A fundamental part of the DFHG project has been devoted to this problem, considering also that in this case the object of citation is a critical edition produced in the 19th century for the technology of the printed book. The collection of the FHG doesn't have author numbers as in the case of the FGrHist.[119] FHG authors are usually cited by referring to their names followed by a reference to the FHG volume number. Given that authors don't have numbers, FHG fragment numbers are usually cited by referring also to the page number of the relevant FHG volume. For example, fragment 1 of Strabo Amasensis can be cited as "FHG III 491 fr. 1." As I described in section 4.3.1, the digital version of the FHG is a textual database arranged according to fields that fully respect the organization of the printed collection by volumes, fragmentary authors, fragmentary works,

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115 Results of the *Liddell-Scott Lexicon in the CITE Architecture* in the DFHG *search tool* show also inflected forms. This is the reason why, searching συγγραφῇ, the DFHG *search tool* returns this form in the entries of the *Liddell-Scott Lexicon in the CITE Architecture.*

116 On the language of ancient Greek fragmentay historiography and in particular of Atthidography, see Berti (2009b) 1–27.

117 Cf. Cayless (2019).

118 Silvello (2015); Buneman/Davidson et al. (2016). As for Classical studies, see Smith (2009) and Cayless (2019).

119 Cf. Bonnechère (1999).

and fragments. This arrangement can be visualized in the navigation menu of the DFHG *main page* (fig. 4.4). Each menu element of the DFHG *main page* has a unique identifier expressed as a URN. The syntax of each URN represents the editorial work of Karl Müller, who arranged fragments in a sequence and attributed them to fragmentary authors, works, work sections and book numbers. The following examples show different levels of granularity of these URNs, that are used to identify and cite fragmentary authors and works down to the fragment level:

– `urn:lofts:fhg.1.hecataeus` identifies the author Hecataeus in FHG I;
– `urn:lofts:fhg.1.hecataeus.hecataei_fragmenta` identifies the whole section of Hecataeus' fragments in FHG I;
– `urn:lofts:fhg.1.hecataeus.hecataei_fragmenta.genealogiae` identifies Hecataeus' Γενεαλογίαι in FHG I;
– `urn:lofts:fhg.1.hecataeus.hecataei_fragmenta.genealogiae.liber_secundus` identifies the second book of Hecataeus' Γενεαλογίαι in FHG I;
– `urn:lofts:fhg.1.hecataeus.hecataei_fragmenta.genealogiae.liber_secundus:350` identifies fragment 350 of the second book of Hecataeus' Γενεαλογίαι in FHG I.

A URN identifies itself as a uniform resource name in the LOFTS domain, whose acronym stands for *Leipzig Open Fragmentary Texts Series* (LOFTS) that represents the domain of textual fragments.[120] Work titles, work sections, books and chapters in the URN are expressed in the Latin translation provided by Müller in the FHG.[121] URNs are combined with a URL prefix (`http://www.dfhg-project.org/DFHG/#`) to generate stable links. URNs are not stored in the database, but are generated with the PHP script that creates HTML pages of the DFHG *content* and are used as unique identifiers of the different HTML tags that represent the entire structure of the FHG. The structure allows to reach every part of the collection without realoading the page not only if we select a menu element, but also if we use a link containing an anchor with a URN (e.g., `#urn:lofts:fhg.1.hecataeus.hecataei_fragmenta.genealogiae.liber_secundus:350`).

By using URN identifiers, it is possible to export citations of DFHG fragments and source texts down to the word level. By selecting a portion of text in the DFHG *main page* and holding down the ALT-key, users get a pop-up window with the URN that identifies the selected chunk of text. For example:

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120 Berti/Almas et al. (2016); Berti (2018); Berti (2019c).
121 On these translations, see p. 149 n. 50.
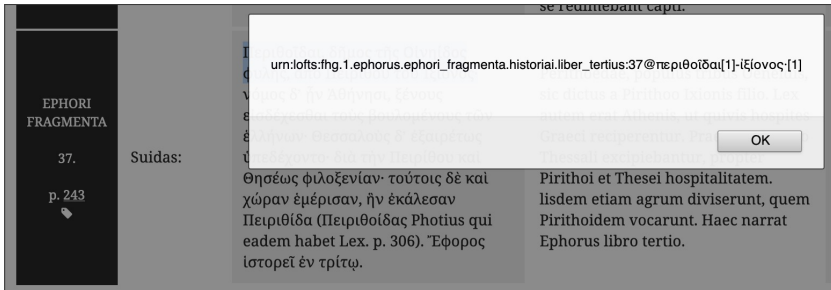
Figure 4.12. LOFTS URN: Ephorus fr. 37

- `urn:lofts:fhg.1.ephorus.ephori_fragmenta.historiae.liber_tertius:37` `@περιθοῖδαι[1]-ἰξίονος[1]` identifies the sentence Περιθοῖδαι, δῆμος τῆς Οἰνηίδος φυλῆς, ἀπὸ Πειρίθου τοῦ Ἰξίονος in Ephorus' fragment 37 (FHG I 243).
- `urn:lofts:fhg.1.apollodorus_atheniensis.apollodori_atheniensis.bibl` `iothecae.liber_primus.caput_i:1@οὐρανὸς[1]-κόσμου[1]` identifies the sentence Οὐρανὸς πρῶτος τοῦ παντὸς ἐδυνάστευσε κόσμου in Apollodorus, *Bibliotheca* 1.1.1 (FHG I 104).

Figures 4.12 and 4.13 show the pop-up windows of these two examples with their relevant URNs. The pop-up window containing the URN is created on the fly via AJAX getting information directly from the HTML code. The URN is obtained from the identifier of the parent HTML tag containing the text of fragments and source texts. The substring of the URN that identifies the word or the range of words selected by the user is created via AJAX analyzing the HTML tags that contain the first and the last word of the selected portion of text (cf. p. 151 n. 54).
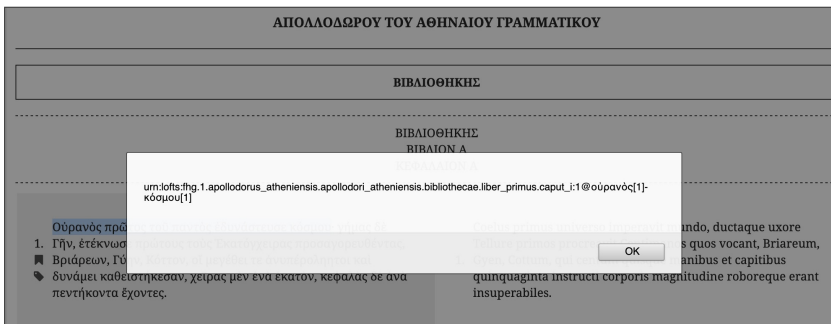
Figure 4.13. LOFTS URN: Apollodorus, *Bibl.* 1.1.1

The DFHG provides also a *URN Retriever*, which is a tool for retrieving and citing passages and words in the fragments by typing their corresponding URNs.[122] For example:

– Hellanicus' fragment 1 corresponds to
  `urn:lofts:fhg.1.hellanicus.hellanici_fragmenta.phoronis:1`
– the beginning of Hellanicus' fragment 1 (Ἑλλάνικος ὁ Λέσβιος τοὺς Τυρρηνούς φησι, Πελασγοὺς πρότερον καλουμένους, ἐπειδὴ κατῴκησαν ἐν Ἰταλίᾳ, παραλαβεῖν ἣν ἔχουσι προσηγορίαν) corresponds to
  `urn:lofts:fhg.1.hellanicus.hellanici_fragmenta.phoronis:1@ἑλλάνικος [1]-προσηγορίαν[1]`

In the second example, the DFHG *URN Retriever* highlights the portion of text corresponding to the URN (fig. 4.14). A well known problem of the FHG is that the editor was not always consistent with fragment numbers and there are examples of fragments with more than one withness under the same number but without disambiguating letters. The DFHG maintains and represents these inconsistencies, even if they are not ideal from a computational point of view, and the DFHG *URN Retriever* works accordingly.[123] For example, Pherecydes' fragment 44 in FHG I corresponds to three source texts. By typing `urn:lofts:fhg.1.pherecydes.pherecydis_fragmenta.historiai.liber_quintus:44`, the DFHG *URN Retriever* returns as a result the three corresponding source texts (fig. 4.15).

As far as author names are concerned, the FHG includes 5 cases of authors who are homonymous but not edited in the same volume: *Anonymus* (FHG III 654–655; FHG V.1 174–187),[124] *Antiochus* (FHG I 181–184; FHG IV 306), *Eusebius* (FHG III 728; FHG V.1 21–23),[125] *Nicomachus* (FHG III 664; FHG IV 465), and *Theocles* (FHG III 665; FHG IV 512). The sixth case is the name *Joannes Antiochenus*, who corresponds to the same author whose fragments are published in two different sections in FHG IV (535–622) and FHG V.1 (27–38). The inclusion of the number of the FHG volume in the URN syntax avoids conflicting identifiers (e.g., `urn:lofts:fhg.3.theocles` and `urn:lofts:fhg.4.theocles`). The following FHG authors are homonymous, but their headings include attributes to disambiguate their identity:

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122 http://www.dfhg-project.org/DFHG/urn_retriever.php

123 See p. 151 n. 51.

124 The second author in the FHG has the heading *Anonymi Periplus Ponti Euxini*. In this case, the work title has been separated from the author name to fill in both fields in the DFHG database.

125 Sources about this author are edited together in BNJ 101.

Figure 4.14. LOFTS URN: beginning of Hellanicus fr. 1

<div style="columns:2">

Aelius Dius (FHG IV)

Aelius Harpocration (FHG IV)

Agatharchides Cnidius (FHG III)

Agatharchides Samius (FHG III)

Andron Alexandrinus (FHG II)

Andron Ephesius (FHG II)

Andron Halicarnassensis (FHG II)

Andron Tejus (FHG II)

Anonymus Corinthius (FHG III)

Anonymus Milesius (FHG III)

Anonymus qui Dionis Cassii Historias continuavit (FHG III)

Antipater (FHG IV)

Antipater Macedo (FHG II)

Apollodorus (FHG I)

Apollodorus Artemiten (FHG IV)

Apollodorus Atheniensis (FHG I)

Apollodorus Erythraeus (FHG IV)

Apollonius Acharnenses (FHG IV)

Apollonius Aphrodisiensis (FHG IV)

Apollonius Ascalonita (FHG IV)

Apollonius Rhodius (FHG IV)

Aristippus (FHG IV)

Aristippus Cyrenaeus (FHG II)

Aristo Alexandrinus (FHG III)

Aristo Pellaeus (FHG IV)

Aristodemus (FHG V.1)

Aristodemus Eleus (FHG III)

Aristodemus Nysaensis (FHG III)

Aristodemus Thebanus (FHG III)

Arrianus (FHG III)

Arrianus Nicomedensis (FHG III)

Artemon Cassandrensis (FHG IV)

Artemon Clazomenius (FHG IV)

Artemon Pergamenus (FHG IV)

Asclepiades Anazarbensis (FHG III)

Asclepiades Arei filius (FHG III)

Asclepiades Cyprius (FHG III)

Asclepiades Mendesius (FHG III)

Asclepiades Myrleanus (FHG III)

Asclepiades Tragilensis (FHG III)

Athenaeus (FHG IV)

Athenaeus Naucratita (FHG III)

Athenodorus Eretriensis (FHG IV)

Athenodorus Tarsensis (FHG III)

Bion Proconnesius (FHG II)

Bion Solensis (FHG IV)

Callicrates (FHG IV)

Callicrates Tyrius (FHG III)

Charon (FHG I)

Charon Naucratites (FHG IV)

Claudius Caesar (FHG III)

Claudius Eusthenes (FHG III)

Claudius Iolaus (FHG IV)

Claudius Theon (FHG IV)

Cleon Magnesius (FHG IV)

</div>

DFHG URN Retriever

j.1.pherecydes.pherecydis_fragmenta.historiai.liber_quintus:44 [Submit]

PHERECYDES

PHERECYDIS FRAGMENTA

ΙΣΤΟΡΙΑΙ

ΙΣΤΟΡΙΑΙ
LIBER QUINTUS

Mythi Thebani (Apollodor. III, c. 4—8): de Cadmo et de Spartis (44), de monili aureo (45), de Dionyso et de Hyadibus (46), de Medusa, OEdipi nutrice (47), de OEdipi progenie (48), de Polynice (49), de Tiresia (50), de Tydei inhumanitate (51). Praeterea Pherecydes Locrorum fabulas in hoc libro tractasse vel saltem attigisse videtur (51 a).

PHERECYDIS FRAGMENTA 44. p. 83		
Schol. Apollon. III, 1178:	Φερεκύδης ἐν τῇ πέμπτῃ (cod. Paris. ἐν ζʹ) οὕτω φησίν· «Ἐπειδὴ Κάδμος κατῳκίσθη ἐν Θήβῃσιν, Ἄρης διδοῖ αὐτῷ καὶ Ἀθηναίη τοῦ ὄφιος τοὺς ἡμίσεας ὀδόντας, τοὺς δὲ ἡμίσεας Αἰήτῃ· καὶ ὁ Κάδμος αὐτίκα σπείρει αὐτοὺς εἰς τὴν ἄρουραν, Ἄρεος κελεύσαντος, καὶ αὐτῷ ἀναφύονται ἄνδρες (codex Paris. addit πολλοὶ) ὡπλισμένοι. Ὁ δὲ Κάδμος δείσας, βάλλει αὐτοὺς λίθοισιν. Οἱ δὲ δοκέοντες ὑφ' ἑαυτῶν (codex Paris. ὑπ' ἀλλήλων) βάλλεσθαι, κτείνουσί τε ἀλλήλους καὶ θνῄσκουσι, πλὴν πέντε ἀνδρῶν, Οὐδαίου, χθονίου, Ἐχίονος, Πέλωρος, Ὑπερήνορος· καὶ αὐτοὺς ὁ Κάδμος ποιεῖται πολίτας, κατοικίσας αὐτοὺς (Phav. Κάδμος πολίτας κατῴκισεν) ἐν Θήβαις.	Postquam Cadmus Thebis sedes sibi constituerat, Mars et Minerva dimidiam ei draconis dentium partem, dimidiam Aeetae dederunt. Atque Cadmus a Marte jussus statim condidit eos in humo, unde nascuntur et viri armati. Quos timens lapidibus petivit. Illi vero se in se ipsos lapides conjicere putantes mutua caede intereunt, quinque exceptis, Udaeo, Chthonio, Echione, Pelore, Hyperenore, quos cives constituit et Thebis sedes iis assignat.
PHERECYDIS FRAGMENTA 44. p. 83		
Schol. Pindar. Isthm. VII, 13:	Φερεκύδης διττά φησιν εἶναι σπαρτῶν γένη. Τὸν γὰρ Ἄρη καὶ τὴν Ἀθηνᾶν, τοὺς μὲν ἡμίσεας τῶν ὀδόντων Κάδμῳ δοῦναι, τοὺς δὲ ἡμίσεας Αἰήτῃ.	Pherecydes duplex ait esse Spartorum genus: Martem enim et Minervam dimidiam dentium partem Cadmo dedisse, dimidiam Aeetae.
PHERECYDIS FRAGMENTA 44. p. 83		
Apollodor. 4, 1:	Φερεκύδης δὲ φησιν, ὅτι Κάδμος, ἰδών ἐκ γῆς ἀναφυομένους ἄνδρας ἐνόπλους, ἐπ' αὐτοὺς ἔβαλε λίθους· οἱ δὲ, ὑπ' ἀλλήλων νομίζοντες βάλλεσθαι, εἰς μάχην κατέστησαν.	Sed Pherecydes scriptum reliquit: Cadmus, utarmatos viros e terra exoriri conspexit, lapides in eos conjecit. Tum ii vicissim percuti existimantes, mutuam inter se pugnam inierunt.

Figure 4.15. LOFTS URN: Pherecydes fr. 44

Cleon Syracusanus (FHG IV)
Demetrius Byzantius (FHG II)
Demetrius Callatianus (FHG IV)
Demetrius Erythraeus (FHG IV)
Demetrius Iliensis (FHG IV)
Demetrius Odessanus (FHG IV)
Demetrius Phalereus (FHG II)
Demetrius Sagalassensis (FHG III)
Demetrius Salaminius (FHG IV)
Democritus Abderita (FHG II)
Democritus Ephesius (FHG IV)
Demodamas Halicarnassensis (FHG II)
Demodamas Milesius (FHG II)
Diocles Peparethius (FHG III)
Diocles Rhodius (FHG III)
Diodorus Periegeta (FHG II)
Diodorus Sardianus (FHG III)
Diodorus Siculus (FHG II)
Diogenes Cyzicenus (FHG IV)
Diogenes Sicyonius (FHG IV)
Dionysius Argivus (FHG III)
Dionysius Byzantius (FHG V.1)
Dionysius Chalcidensis (FHG IV)
Dionysius Halicarnassensis (FHG II)
Dionysius Heracleota (FHG II)
Dionysius Milesius (FHG II)
Dionysius Mytilenaeus (FHG II)
Dionysius Pergamenus (FHG III)
Dionysius Rhodius sive Samius (FHG II)
Dionysius Thrax (FHG III)
Dionysius Tyrannus (FHG II)
Diophantus (FHG IV)
Diophantus Lacedaemonius (FHG IV)
Ephorus (FHG I)
Ephorus Cumanus (FHG III)
Glaucus (FHG IV)
Glaucus Rheginus (FHG II)
Hecataeus (FHG I)
Hecataeus Abderita (FHG II)
Hegesander Delphus (FHG IV)
Hegesander Salaminius (FHG IV)
Heraclides Cumanus (FHG II)
Heraclides Lembus (FHG III)
Heraclides Ponticus (FHG II)
Hermesianax Colophonius (FHG IV)
Hermesianax Cyprius (FHG IV)
Hippias Eleus (FHG II)
Hippias Erythraeus (FHG IV)
Joannes Epiphaniensis (FHG IV)

Joannes Malala (FHG V.1)
Leo Alabandensis (FHG II)
Leo Byzantius (FHG II)
Leo Pellaeus (FHG II)
Melanthius (FHG IV)
Melanthius Pictor (FHG IV)
Menander Ephesius (FHG IV)
Menander Protector (FHG IV)
Menecrates Elaita (FHG II)
Menecrates Nysaensis (FHG II)
Menecrates Olynthius (FHG II)
Menecrates Tyrius (FHG II)
Menecrates Xanthius (FHG II)
Nicander Alexandrinus (FHG IV)
Nicander Chalcedonius (FHG IV)
Nicander Thyatirenus (FHG IV)
Nicias (FHG IV)
Nicias Maleotes (FHG IV)
Nicias Nicaeensis (FHG IV)
Nicostratus (FHG IV)
Nicostratus Trapezuntius (FHG III)
Pausanias Damascenus (FHG IV)
Pausanias Laco (FHG IV)
Philistus (FHG I)
Philistus Naucratita (FHG IV)
Posidonius Apamensis (FHG III)
Posidonius Olbiopolita (FHG III)
Priscus (FHG V.1)
Priscus Panites (FHG IV)
Ptolemaeus Evergetes II (FHG III)
Ptolemaeus Megalopolitanus (FHG III)
Ptolemaeus Mendesius (FHG IV)
Seleucus Alexandrinus (FHG III)
Seleucus Emesenus (FHG IV)
Socrates Argivus (FHG IV)
Socrates Cous (FHG IV)
Socrates Rhodius (FHG III)
Sosicrates (FHG IV)
Sosicrates Rhodius (FHG IV)
Strato (FHG III)
Strato Lampsacenus (FHG II)
Theodorus Gadarenus (FHG III)
Theodorus Hierapolita (FHG IV)
Theodorus Iliensis (FHG IV)
Theodorus Rhodius (FHG IV)
Theodorus Samothrax (FHG IV)
Theophanes Byzantius (FHG IV)
Theophanes Mytilenaeus (FHG III)

The DFHG project provides also CITE URNs of FHG authors according to the guidelines of the *CITE Architecture*. The syntax of these URNs is different because they don't represent the whole structure of the FHG, but only the elements of traditional citations of FHG fragments. For example, Ephorus is identified as `urn:cite:lofts:fhg.1.ephorus` and Ephorus fr. 1 is identified as `urn:cite:lofts:fhg.1.ephorus:1`. CITE URNs are accessible through the DFHG API, the DFHG *Fragmentary Authors Catalog*, and the *Müller-Jacoby Table of Concordance.*[126]

4.3.6 Web API

⚙ In order to allow users to access data about the *fragmenta* of the FHG, the project has implemented a Web API that can be queried by combining an author name (`author`), a fragment number (`fragment`), and a volume name (`volume`):[127]

```
api.php?author=<author name>&fragment=<fragment number>&volume=<volume name>
```

The result of the query is a JSON that displays 27 key/value pairs, whose keys contain data from 25 fields of the DFHG database with the addition of 2 keys for URNs and CITE URNs of FHG texts.[128] I present here five examples:

1) Acusilaus, fragment 10.

The query is `api.php?author=ACUSILAUS&fragment=10` and generates the following JSON object:

```
[
    {
        "volume": "Volumen primum",
        "sub_volume": "",
        "sub_volume_note": "",
        "author": "ACUSILAUS",
        "section": "ACUSILAI FRAGMENTA",
        "work": "ΓΕΝΕΑΛΟΓΙΑΙ",
        "work_note": "",
```

---

126 See sections 4.3.6, 4.4.1, and 4.4.3.

127 The DFHG Web API usage web page is available at http://www.dfhg-project.org/DFHG/api.php. The `author` key is mandatory, while `fragment` and `volume` are optional. The web page includes the list of authors who are accessible through the API and who are accompanied by volume names (e.g., Volumen secundum) in order to disambiguate homonyms (see below). There are 7 authors in the FHG whose names are printed within round and square brackets (see p. 149 n. 48). Brackets are preserved in the DFHG database and consequently in the Web API and in the list in the usage web page. Brackets are necessary in an API query in order to get a JSON object.

128 For the description of the fields of the DFHG database, see pp. 148 ff. On identifiers of FHG texts expressed in the form of URNs and CITE URNs, see p. 176.

```
        "work_section": "",
        "work_section_note": "",
        "book": "",
        "book_note": "",
        "chapter": "",
        "section": "",
        "sub_section": "",
        "page": "101",
        "type": "fragment",
        "sub_type": "",
        "fragment_number": "10",
        "fragment_letter": "",
        "fragment_note": "",
        "witness": "Schol. Apollon. IV, 57:",
        "text": "Τὸν Ἐνδυμίωνα Ἡσίοδος μὲν Ἀεθλίου τοῦ Διὸς καὶ Καλύκης
    παῖδα λέγει, παρὰ Διὸς εἰληφότα δῶρον, αὐτὸν ταμίαν εἶναι θανάτου,
    ὅτε μέλλοι ὀλέσθαι. Καὶ Πείσανδρος δὲ τὰ αὐτά φησι, καὶ Ἀκουσίλαος,
    καὶ Φερεκύδης.",
        "translation": "Endymionem Hesiodus dicit Aethlio, Jovis filio,
    ex Calyce natum, cui a Jove dono datum esset, se moriturum mortis
    arbitrum esse. Eadem narrant Pisander, Acusilaus, Pherecydes.",
        "commentary": "",
        "note": "",
        "urn": "urn:lofts:fhg.1.acusilaus.acusilai_fragmenta.genealogiae
    :10",
        "cite_urn": "urn:cite:lofts:fhg1.acusilaus:10"
    }
]
```

2) Apollodorus Atheniensis, Volumen primum.

The query is `api.php?author=APOLLODORUS ATHENIENSIS&volume=Volumen primum` and generates the three following JSON objects:[129]

```
[
    {
        "volume": "Volumen primum",
        "sub_volume": "",
        "sub_volume_note": "",
        "author": "APOLLODORUS ATHENIENSIS",
        "section": "ΑΠΟΛΛΟΔΩΡΟΥ ΤΟΥ ΑΘΗΝΑΙΟΥ ΓΡΑΜΜΑΤΙΚΟΥ",
        "work": "FRAGMENTA BIBLIOTHECAE",
        "work_note": "Quum Photii testimonio compertum habeamus
    Apollodorum in Bibliotheca usque ad Ulyssis errores narrationem
```

---

129 The DFHG includes also the text of the *Bibliotheca* of Apollodorus Atheniensis, which is not displayed in the JSON object because it is classified as `extant text` in the database (see section 4.3.1.1). This is the reason why the JSON shows only the fragments of the *Bibliotheca* that are classified as `fragment` (see below).

```
                produxisse, quae sequuntur fragmenta ex extrema hujus operis parte
        videntur repetita.",
            "work_section": "",
            "work_section_note": "",
            "book": "",
            "book_note": "",
            "chapter": "",
            "section": "",
            "sub_section": "",
            "page": "180",
            "type": "fragment",
            "sub_type": "",
            "fragment_number": "1",
            "fragment_letter": "",
            "fragment_note": "",
            "witness": "Schol. ad Lycophr. 440:",
            "text": "Καὶ οὕτω μὲν οἱ πολλοὶ φασὶν, ὅτι μετὰ Μόψον ἀπῆλθεν
        εἰς Κιλικίαν Ἀμφίλοχος. Ἄλλοι δὲ φασὶν, ὡς καὶ Ἀπολλόδωρος, ὅτι
        Ἀμφίλοχος ὁ Ἀλκμαίωνος ὕστερον στρατεύσας εἰς Τροίαν, μετὰ χειμῶνα
        ἀπερρίφη πρὸς Μόψον, καὶ ὑπὲρ τῆς βασιλείας μονομαχοῦντες ἀλλήλους
        ἀπέκτειναν.",
            "translation": "Amphilochus Alcmaeonis filius postea in bellum
        profecTus contra Trojam tempestate delatus est ad Mopsum. Qui quum
        de regno singulari certamine contenderent, se ipsi mutuo
        interemerunt.",
            "commentary": "",
            "note": "",
            "urn": "urn:lofts:fhg.1.apollodorus_atheniensis.
        apollodori_atheniensis.fragmenta_bibliothecae:1",
            "cite_urn": "urn:cite:lofts:fhg1.apollodorus_atheniensis:1"
        },
        {
            "volume": "Volumen primum",
            "sub_volume": "",
            "sub_volume_note": "",
            "author": "APOLLODORUS ATHENIENSIS",
            "section": "ΑΠΟΛΛΟΔΩΡΟΥ ΤΟΥ ΑΘΗΝΑΙΟΥ ΓΡΑΜΜΑΤΙΚΟΥ",
            "work": "FRAGMENTA BIBLIOTHECAE",
            "work_note": "Quum Photii testimonio compertum habeamus
        Apollodorum in Bibliotheca usque ad Ulyssis errores narrationem
        produxisse, quae sequuntur fragmenta ex extrema hujus operis parte
        videntur repetita.",
            "work_section": "",
            "work_section_note": "",
            "book": "",
            "book_note": "",
            "chapter": "",
            "section": "",
            "sub_section": "",
```

```json
        "page": "180",
        "type": "fragment",
        "sub_type": "",
        "fragment_number": "2",
        "fragment_letter": "",
        "fragment_note": "",
        "witness": "Ibidem 902:",
        "text": "Καὶ ὁ μὲν Λυκόφρων Γουνέα, Πρόθοον καὶ Εὐρύπυλον εἰς
Λιβύην φησὶν ἀπελθεῖν· Ἀπολλόδωρος δὲ καὶ οἱ λοιποὶ οὕτω φασί.
Γουνεὺς εἰς Λιβύην, λιπὼν τὰς ἑαυτοῦ ναῦς, ἐπὶ Κίνυφα ποταμὸν ἐλθὼν,
κατοικεῖ,— Μάγνητες δὲ καὶ Πρόθοος ἐν Εὐβοίᾳ περὶ τὸν Καφηρέα σὺν
πολλοῖς ἑτέροις διαφθείρονται. Νεοπτόλεμος δὲ μετὰ ἑπτὰ ἡμέρας πεζῇ
εἰς Μολοσσοὺς ἀπῆλθε μετὰ Ἑλένου, καθ᾽ ὁδοῦ θάψας τὸν Φοίνικα. Τοῦ
δὲ Προθόου περὶ τὸν Καφηρέα ναυαγήσαντος, οἱ σὺν αὐτῷ Μάγνητες εἰς
Κρήτην ῥιφέντες ᾤκησαν",
        "translation": "Guneus in Libya relinquens naves suas venit ad
Cinyphem fluvium ibique habitavit. Magnetes autem et Prothous ad
Euboeam prope Caphareum cum multis aliis periere. Sed Neoptolemus
post septem dies pedibus ad Molossos venit cum Heleno, postquam
Phoenicem in itinere sepeliverat. Magnetes denique, qui fuerant cura
Prothoo ad Caphareum naufrago, in Cretam delati hic consederunt.",
        "commentary": "",
        "note": "",
        "urn": "urn:lofts:fhg.1.apollodorus_atheniensis.
apollodori_atheniensis.fragmenta_bibliothecae:2",
        "cite_urn": "urn:cite:lofts:fhg1.apollodorus_atheniensis:2"
    },
    {
        "volume": "Volumen primum",
        "sub_volume": "",
        "sub_volume_note": "",
        "author": "APOLLODORUS ATHENIENSIS",
        "section": "ΑΠΟΛΛΟΔΩΡΟΥ ΤΟΥ ΑΘΗΝΑΙΟΥ ΓΡΑΜΜΑΤΙΚΟΥ",
        "work": "FRAGMENTA BIBLIOTHECAE",
        "work_note": "Quum Photii testimonio compertum habeamus
Apollodorum in Bibliotheca usque ad Ulyssis errores narrationem
produxisse, quae sequuntur fragmenta ex extrema hujus operis parte
videntur repetita.",
        "work_section": "",
        "work_section_note": "",
        "book": "",
        "book_note": "",
        "chapter": "",
        "section": "",
        "sub_section": "",
        "page": "180",
        "type": "fragment",
        "sub_type": "",
        "fragment_number": "3",
```

```
    "fragment_letter": "",
    "fragment_note": "",
    "witness": "Ibidem 921:",
    "text": "Ὁ Ναύαιθος ποταμός ἐστιν Ἰταλίας. Ἐκλήθη δὲ οὕτω, κατὰ
μὲν Ἀπολλόδωρον καὶ λοιποὺς, ὅτι μετὰ τὴν Ἰλίου ἅλωσιν αἱ
Λαομέδοντος θυγατέρες, Πριάμου δὲ ἀδελφαὶ, Αἰθύλλα, Ἀστυόχη,
Μηδεσικάστη, μετὰ τῶν λοιπῶν αἰχμαλωτῶν ἐκεῖσε γεγονυῖαι τῆς
Ἰταλίας, εὐλαβούμεναι τὴν Ἑλλάδος δουλείαν, τὰ σκάφη ἐνέπρησαν· ὅθεν
ὁ ποταμὸς Ναύαιθος ἐκλήθη, καὶ αἱ γυναῖκες Ναυπρήστιδες. Οἱ δὲ σὺν
αὐταῖς Ἕλληνες, ἀπολέσαντες τὰ ἀκάφη, ἐκεῖ κατῴκησαν.",
    "translation": "Post Trojam captam Laomedontis filiae, Priami
sorores, Aethylla, Astyoche, Medesicaste, verentes apud Graecos
servitutem, ubi cum reliquis captivis huc Italiae pervenerant,
navigia concremarunt; unde fluvius Nauaethus dictus est, et mulieres
Nauprestides. Graeci vero qui cum iis erant, deperditis navigiis,
ibidem habitavere.",
    "commentary": "Conf. Schol. ad v. 1075.",
    "note": "",
    "urn": "urn:lofts:fhg.1.apollodorus_atheniensis.
apollodori_atheniensis.fragmenta_bibliothecae:3",
    "cite_urn": "urn:cite:lofts:fhg1.apollodorus_atheniensis:3"
    }
]
```

3) Hellanicus, fragment 163.

The query is `api.php?author=HELLANICUS&fragment=163` and generates the two follow-ing JSON objects:[130]

```
[
    {
        "volume": "Volumen primum",
        "sub_volume": "",
        "sub_volume_note": "",
        "author": "HELLANICUS",
        "section": "HELLANICI FRAGMENTA",
        "work": "ΠΕΡΣΙΚΑ",
        "work_note": "",
        "work_section": "",
        "work_section_note": "",
        "book": "",
        "book_note": "",
        "chapter": "",
```

---

130 The output includes two fragments because the FHG collects two source texts under the same fragment number with disambiguating letters (163a and 163b). Another example is the query `api.php?author=PHERECYDES&fragment=44` that shows the three source texts collected under fragment 44 of Pherecydes, but without disambiguating letters because in this case they are missing in the FHG. On this issue, see p. 151 n. 51.

```
        "section": "",
        "sub_section": "",
        "page": "68",
        "type": "fragment",
        "sub_type": "",
        "fragment_number": "163",
        "fragment_letter": "a",
        "fragment_note": "",
        "witness": "Clemens Alex. Strom. 1 307, D:",
        "text": "Πρώτην ἐπιστολὰς συντάξαι Ἄτοσσαν, τὴν Περσῶν
βασιλεύσασαν, φησὶν Ἑλλάνικος.",
        "translation": "Primam scripsisse epistolas Atossam Persarum
reginam, dicit Hellanicus.",
        "commentary": "",
        "note": "",
        "urn": "urn:lofts:fhg.1.hellanicus.hellanici_fragmenta.persica
:163.a",
        "cite_urn": "urn:cite:lofts:fhg1.hellanicus:163.a"
},
{
        "volume": "Volumen primum",
        "sub_volume": "",
        "sub_volume_note": "",
        "author": "HELLANICUS",
        "section": "HELLANICI FRAGMENTA",
        "work": "ΠΕΡΣΙΚΑ",
        "work_note": "",
        "work_section": "",
        "work_section_note": "",
        "book": "",
        "book_note": "",
        "chapter": "",
        "section": "",
        "sub_section": "",
        "page": "68",
        "type": "fragment",
        "sub_type": "",
        "fragment_number": "163",
        "fragment_letter": "b",
        "fragment_note": "",
        "witness": "Anonymus de mulieribus quae bello inclaruerunt (in
Bibliothek der alten Literatur und Kunst part. VI, Inedita p. 18
sq.):",
        "text": "Ἄτοσσα. Ταύτην φησὶν Ἑλλάνικος ὑπὸ τοῦ πατρὸς Ἀριάσπου
ὡς ἄρρενα τραφεῖσαν διαδέξασθαι τὴν βασιλείαν. Κρυβοῦσαν δὲ τὴν τῶν
γυναίων ἐπίνοιαν, τιάραν πρώτην φορέσαι· πρώτην δὲ καὶ ἀναξυρίδας,
καὶ τὴν τῶν εὐνούχων ὑπουργίαν εὑρεῖν, καὶ διὰ βίβλων τὰς ἀποκρίσεις
ποιεῖσθαι. Πολλὰ δὲ ὑποτάξασα ἔθνη, πολεμικωτάτη καὶ ἀνδρειοτάτη ἐν
παντὶ ἔργῳ ἐγένετο.",
```

```
    "translation": "Atossam (Belochi, regis Assyriorum, ut videtur,
filiam) Hellanicus dicit ab Ariaspa patre tanquam puerum educatam
regiam suscepisse dignitatem. Occultantem vero quibus femina
agnosci posset, primam caput texisse tiara, braccas invenisse et
eunuchorum ministerium et per epistolas dedisse responsa. Multos
subegit populos, ideoque bellicosissima et fortissima in omnibus
rebus apparuit.",
    "commentary": "",
    "note": "",
    "urn": "urn:lofts:fhg.1.hellanicus.hellanici_fragmenta.persica
:163.b",
    "cite_urn": "urn:cite:lofts:fhg1.hellanicus:163.b"
  }
]
```

4) Cadmus Milesius.

The query is `api.php?author=CADMUS MILESIUS` and generates the following JSON object:[131]

```
[
  {
    "volume": "Volumen secundum",
    "sub_volume": "LIBER PRIMUS",
    "sub_volume_note": "INDE AB INCUNABULIS ARTIS HISTORICAE AD
FINEM BELLI PELOPONNESIACI. 520-404 A.C. NOMINA AUCTORUM. CADMUS
MILESIUS. [HECATAEUS MILESIUS.] DIONYSIUS MILESIUS. HIPPYS
RHEGINUS. EUGEON SAMIUS. DEIOCHUS PROCONNESIUS. BION PROCONNESIUS.
EUDEMUS PARIUS. DEMOCLES PYGELENSIS. AMELESAGORAS CHALCEDONIUS.
[ACUSILAUS ARGIVUS.] [PHERECYDES LERIUS.] [CHARON LAMPSACENUS.]
[XANTHUS LYDIUS.] [HELLANICUS MYTILENAEUS.] [ANTIOCHUS
SYRACUSANUS.] GLAUCUS RHEGINUS. HERODORUS HERACLEENSIS. SIMONIDES
CEUS. XENOMEDES CHIUS. ION CHIUS. STESIMBROTUS THASIUS. HIPPIAS
ELEUS. DAMASTES SIGEENSIS. ANAXIMANDER MILESIUS. CRITIAS
ATHENIENSIS. Fragmenta auctorum quorum nomina uncis inclusimus in
primo hujus collectionis volumine leguntur.",
    "author": "CADMUS MILESIUS",
    "section": "",
    "work": "",
    "work_note": "",
    "work_section": "",
    "work_section_note": "",
    "book": "",
    "book_note": "",
    "chapter": "",
```

---

131 Cadmus Milesius is one of the FHG authors without numbered fragments, but only with an introductory commentary that is not displayed in the JSON output because it is classified as `intro` in the database. On FHG authors without numbered fragments see below.

```
        "section": "",
        "sub_section": "",
        "page": "4",
        "type": "fragment",
        "sub_type": "",
        "fragment_number": "",
        "fragment_letter": "",
        "fragment_note": "",
        "witness": "",
        "text": "",
        "translation": "",
        "commentary": "",
        "note": "",
        "urn": "urn:lofts:fhg.2.cadmus_milesius:",
        "cite_urn": "urn:cite:lofts:fhg2.cadmus_milesius:"
    }
]
```

5) Theocles, Volumen quartum.

The query is `api.php?author=THEOCLES&volume=Volumen quartum` and generates the two following JSON objects:[132]

```
[
    {
        "volume": "Volumen quartum",
        "sub_volume": "LIBER DECIMUS",
        "sub_volume_note": "SCRIPTORES AETATIS INCERTAE EX ORDINE
    LITERARUM",
        "author": "THEOCLES",
        "section": "THEOCLIS FRAGMENTA",
        "work": "",
        "work_note": "",
        "work_section": "",
        "work_section_note": "",
        "book": "E LIBRO QUARTO",
        "book_note": "",
        "chapter": "",
        "section": "",
        "sub_section": "",
        "page": "512",
        "type": "fragment",
        "sub_type": "",
        "fragment_number": "1",
        "fragment_letter": "",
```

---

132 There is another Theocles in FHG III (Volumen tertium). If we query the API with `api.php?author=THEOCLES`, the JSON shows information about the fragments of both authors.

```
        "fragment_note": "",
        "witness": "Aelianus H. an. XVII, 6:",
        "text": "Θεοκλῆς δὲ ἐν τῇ τετάρτῃ περὶ τὴν Σύρτιν λέγει γίνεσθαι
    κήτη τριήρων μείζονα.",
        "translation": "Theocles libro quarto ait ad Syrtin esse
    balaenas triremibus grandiores.",
        "commentary": "",
        "note": "",
        "urn": "urn:lofts:fhg.4.theocles.theoclis_fragmenta.
    e_libro_quarto:1",
        "cite_urn": "urn:cite:lofts:fhg4.theocles:1"
    },
    {
        "volume": "Volumen quartum",
        "sub_volume": "LIBER DECIMUS",
        "sub_volume_note": "SCRIPTORES AETATIS INCERTAE EX ORDINE
    LITERARUM",
        "author": "THEOCLES",
        "section": "THEOCLIS FRAGMENTA",
        "work": "",
        "work_note": "",
        "work_section": "",
        "work_section_note": "",
        "book": "E LIBRO QUARTO",
        "book_note": "",
        "chapter": "",
        "section": "",
        "sub_section": "",
        "page": "512",
        "type": "fragment",
        "sub_type": "",
        "fragment_number": "2",
        "fragment_letter": "",
        "fragment_note": "()",
        "witness": "Plinius H. N. XXXVII, s. 11, § 1:",
        "text": "Theomenes juxta Syrtim magnam hortum Hesperidum esse,
    ex quo in stagnum cadat (electrum), colligi vero a virginibus
    Hesperidum.",
        "translation": "",
        "commentary": "Eundem scriptorem ab Aeliano et Plinio citari
    censeo. Theoclem aliquem poetam ἐν Ἰθυφάλλοις citat Athenaeus p.
    497, C.",
        "note": "",
        "urn": "urn:lofts:fhg.4.theocles.theoclis_fragmenta.
    e_libro_quarto:2",
        "cite_urn": "urn:cite:lofts:fhg4.theocles:2"
    }
]
```

The goal of the DFHG Web API is to output information about FHG *fragmenta* of authors who are lost. In order to generate this output, the API selects FHG source texts that are classified as `fragment` in the DFHG database and that correspond to 613 authors.[133] This number includes 83 authors for whom Karl Müller publishes only introductory commentaries and not numbered *fragmenta*. In this case the field `text` in the database is empty, as in the example of Cadmus Milesius mentioned in the previous pages. The names of these authors are reported below and are arranged by volumes and in the order in which they appear in the collection:

FHG II
Cadmus Milesius
Eudemus Parius
Democritus Abderita
Themistogenes Syracusanus
Aristippus Cyrenaeus
Dionysius Tyrannus
Dionysodorus Boeotus
Anaxis Boeotus
Zoilus Amphipolita
Demophilus
Antipater Macedo
Theodectes Phaselita
Dionysius Heracleota
Demetrius Byzantius
FHG III
Mnesiptolemus
P. Cornelius Scipio
Hannibal Carthaginiensis
Xenophon
Strato
Antisthenes Rhodius
Scylax Caryandensis
Psaon Plataeensis
Lucius Lucullus
Marcus Tullius Cicero
Titus Pomponius Atticus
Asclepiades Cyprius
Asclepiades Anazarbensis

Artavasdes Armeniae Rex
Empylus Rhodius
Dionysius Pergamenus
Diodorus Sardianus
Theodorus Gadarenus
Polyaenus Sardianus
Justus Tiberiensis
Aspasius Byblius
Judas
Arrianus
FHG IV
Acestodorus vel Acestorides
Aeneas
Adaeus Mytilenaeus
Agriopas
Anaxilaus
Antimachus
Antiochus
Apollonius Ascalonita
Apollonius Acharnenses
Apollonius Rhodius
Aristeas Argivus
Aristonymus
Artemidorus Ascalonita
Athenaeus
Athenocles
Augeas
Bruttius sive Brettius
Butorides

Caemaro
Callicrates
Cassander Salaminius
Chrestodemus
Christodorus
Claudius Theon
Clodius Neapolitanus
Cydippus Mantinensis
Demetrius Erythraeus
Demetrius Iliensis
Dion Academicus
Diogenes Sicyonius
Hermesianax Colophonius
Hiero
Hypsicrates
Lamiscus Samius
Menippus
Mnasigiton
Myes
Nicomachus
Pappus
Philalius Corinthius
Polygnostus sive Polygnotus
Pyrrho Liparaeus
Pythagoras
Sosander
Theodori
Zopyrion

The DFHG Web API generates also JSON objects about 7 authors whose source texts are classified part as `fragment` and part as `extant text`, like in the example of Apollodorus Atheniensis mentioned in the previous pages. In these cases the JSON shows only source texts classified as `fragment`:

---

133 These 613 authors are listed in the DFHG Web API usage web page. The FHG has a total of 636 authors including both `fragment` and `extant text`. On this classification, see p. 148.

FHG I	**FHG III**	**FHG V.2**
Apollodorus Atheniensis	Phlegon Trallianus	Bardesane
FHG II	**FHG IV**	Faustus de Byzance
Dicaearchus Messenius	Hesychius Milesius	Léroubna d'Édesse

The following 23 FHG authors are not included in the output of the Web API because their source texts are classified as `extant text` in the DFHG database:

FHG I	Anonymus, qui Dionis Cassii	Dionysius Byzantius
Marmor Parium	Historias continuavit	**FHG V.2**
Marmor Rosettanum	Joannes Epiphaniensis	Agathange
FHG II	**FHG V.1**	Zénob de Glag
Diodorus Siculus	Aristodemus	Jean Mamigonien
Polybius Megalopolitanus	Eusebius	Moïse de Khorène
Dionysius Halicarnassensis	Priscus	Le Pseudo-Callisthènes
Heraclides Ponticus	Critobulus	Gregoire Magistros Duc de
FHG III	Photius	La Mesopotamie
Memnon	Anonymus (Periplus Ponti	Saint Epiphane évêque de
FHG IV	Euxini)	Salamine en Chypre

4.3.7 Outputs

⬇ The DFHG project automatically exports data of the FHG collection in two formats: 1) CSV format files and 2) XML format files. The goal of the Web API is to access information about FHG sources that are classified as `fragment`, which means quotations and text reuses of lost texts. On the other side, the goal of the CSV and XML output is to export data about all texts collected in the FHG. This is the reason why these outputs include sources classified both as `fragment` and as `extant text`, generating 636 files that correspond to the total number of authors edited in the FHG.[134]

A PHP script extracts from the database a CSV file for each of the 636 FHG authors. These files can de downloaded through a dedicated web page of the DFHG project where authors are arranged by FHG volumes and in the order in which they are published in the printed edition (fig. 4.16).[135] Each CSV file corresponds to one FHG author and contains data records from the following 25 fields of the DFHG database with the addition of 2 fields for LOFTS URNs and CITE URNs:[136] 1) volume, 2) `sub_volume`, 3) `sub_volume_note`, 4) `author`, 5) `section`, 6)

---

134 Data classified with the type `intro` are not exported in the CSV and XML files (cf. p. 148). The reason for this choice is due to the fact that, if the DFHG project aims at preserving the entire edition of the FHG in a structured and machine readable format, the main goal is to focus on the ancient sources collected in the printed volumes.

135 The web page is available at http://www.dfhg-project.org/DFHG/export_csv.php.

136 For a detailed description of the DFHG database fields, see pp. 148 ff.

Digital Fragmenta Historicorum Graecorum (DFHG)

Volumen primum

- HECATAEUS (.csv)
- CHARON (.csv)
- XANTHUS (.csv)
- HELLANICUS (.csv)
- PHERECYDES (.csv)
- ACUSILAUS (.csv)
- APOLLODORUS ATHENIENSIS (.csv)

- ANTIOCHUS (.csv)
- PHILISTUS (.csv)
- TIMAEUS (.csv)
- EPHORUS (.csv)
- THEOPOMPUS (.csv)
- PHYLARCHUS (.csv)
- CLIDEMUS (.csv)
- PHANODEMUS (.csv)

- ANDROTIO (.csv)
- DEMO (.csv)
- PHILOCHORUS (.csv)
- ISTER (.csv)
- APOLLODORUS (.csv)
- MARMOR PARIUM (.csv)
- MARMOR ROSETTANUM (.csv)

Volumen secundum

- DIODORUS SICULUS (.csv)
- POLYBIUS MEGALOPOLITANUS (.csv)
- DIONYSIUS HALICARNASSENSIS (.csv)
- CADMUS MILESIUS (.csv)
- DIONYSIUS MILESIUS (.csv)
- DIONYSIUS MYTILENAEUS (.csv)
- DIONYSIUS RHODIUS SIVE SAMIUS (.csv)
- HIPPYS RHEGINUS (.csv)
- EUGEON SAMIUS (.csv)
- DEIOCHUS PROCONNESIUS (.csv)
- BION PROCONNESIUS (.csv)
- EUDEMUS PARIUS (.csv)
- DEMOCLES PYGELENSIS (.csv)
- AMELESAGORAS CHALCEDONIUS (.csv)
- GLAUCUS RHEGINUS (.csv)
- DEMOCRITUS ABDERITA (.csv)
- HERODORUS HERACLEENSIS (.csv)
- SIMONIDES CEUS (.csv)
- XENOMEDES CHIUS (.csv)
- ION CHIUS (.csv)
- STESIMBROTUS THASIUS (.csv)
- HIPPIAS ELEUS (.csv)

- DIONYSODORUS BOEOTUS (.csv)
- ANAXIS BOEOTUS (.csv)
- ZOILUS AMPHIPOLITA (.csv)
- CEPHISODORUS (.csv)
- DEMOPHILUS (.csv)
- THEOCRITUS CHIUS (.csv)
- DINO (.csv)
- HERACLIDES CUMANUS (.csv)
- ARISTAGORAS MILESIUS (.csv)
- ARISTOTELES (.csv)
- DIOSCORIDES (.csv)
- HERACLIDES PONTICUS (.csv)
- DICAEARCHUS MESSENIUS (.csv)
- ARISTOXENUS TARENTINUS (.csv)
- PHANIAS ERESIUS (.csv)
- CLEARCHUS SOLENSIS (.csv)
- LEO BYZANTIUS (.csv)
- LEO ALABANDENSIS (.csv)
- LEO PELLAEUS (.csv)
- CLYTUS MILESIUS (.csv)
- MAEANDRIUS MILESIUS (LEANDER MILESIUS) (.csv)

- DIODORUS PERIEGETA (.csv)
- DIYLLUS ATHENIENSIS (.csv)
- DEMETRIUS PHALEREUS (.csv)
- STRATO LAMPSACENUS (.csv)
- THEODECTES PHASELITA (.csv)
- LYCUS RHEGINUS (.csv)
- NYMPHODORUS SYRACUSANUS (.csv)
- CALLIAS SYRACUSANUS (.csv)
- ANTANDER SYRACUSANUS (.csv)
- HECATAEUS ABDERITA (.csv)
- PSEUDO-HECATAEUS (.csv)
- AMOMETUS (.csv)
- MEGASTHENES (.csv)
- DAIMACHUS PLATAEENSIS (.csv)
- PATROCLES (.csv)
- DEMODAMAS MILESIUS (.csv)
- [DEMODAMAS HALICARNASSENSIS] (.csv)
- DEMOCHARES LEUCONOENSIS (.csv)
- HIERONYMUS CARDIANUS (.csv)
- PYRRHUS EPIROTA (.csv)
- PROXENUS (.csv)
- CINEAS THESSALUS (.csv)

DFHG Project

Figure 4.16. DFHG: CSV output

work, 7) `work_note`, 8) `work_section`, 9) `work_section_note`, 10) `book`, 11) `book_note`, 12) `chapter`, 13) `section`, 14) `sub_section`, 15) `page`, 16) `type`, 17) `sub_type`, 18) `fragment_number`, 19) `fragment_letter`, 20) `fragment_note`, 21) `witness`, 22) `text`, 23) `translation`, 24) `commentary`, 25) `note`, 26) `urn`, 27) `cite_urn`.

As far as the XML format is concerned, a PHP script exports from the database two different kinds of files: 1) 636 EpiDoc TEI XML files, and 2) 636 well formed XML files. EpiDoc TEI XML files are encoded in accordance with EpiDoc standards. These files are available through a GitHub repository and through a dedicated web page of the DFHG project where authors are arranged by FHG volumes and in the order in which they are published in the printed edition.[137] The structure of these files is based on guidelines that have been specifically developed for the DFHG project as part of the EpiDoc community.[138] Every EpiDoc TEI XML file corresponds to one FHG author, whose texts are encoded within a complex structure that represents the editorial work of Karl Müller as it is published in the printed edition. Every file is generated with a PHP script that extracts records from the fields of the DFHG database. Each EpiDoc TEI XML file shares the same TEI Header with information about the project, the relevant FHG volume, and the relevant author:

---

137 See https://dfhg-project.github.io and http://www.dfhg-project.org/DFHG/export_xml.php.
138 Berti/Almas et al. (2014–2015).

```xml
1  <TEI xmlns="http://www.tei-c.org/ns/1.0" xml:id="dfhg##volume_no##_##
      author_id##">
2    <teiHeader>
3      <fileDesc>
4        <titleStmt>
5          <title>Digital Fragmenta Historicorum Graecorum</title>
6          <editor>Karl Müller</editor>
7          <sponsor>University of Leipzig</sponsor>
8          <funder>Alexander von Humboldt Stiftung</funder>
9          <principal>Monica Berti</principal>
10         <respStmt>
11           <persName xml:id="MB">Monica Berti</persName>
12           <resp>Editor-in-chief</resp>
13         </respStmt>
14         <respStmt>
15           <persName xml:id="GRC">Gregory R. Crane</persName>
16           <resp>Associate editor</resp>
17         </respStmt>
18       </titleStmt>
19       <publicationStmt>
20         <authority/>
21         <idno type="filename">##file_name##</idno>
22         <availability>
23           <ab><ref target="http://www.dfhg-project.org/"/></ab>
24           <licence target="http://creativecommons.org/licenses/by-sa
      /4.0/">Available under a Creative Commons Attribution-ShareAlike
      4.0 International License</licence>
25         </availability>
26         <publisher>University of Leipzig</publisher>
27         <pubPlace>Germany</pubPlace>
28         <date>2017</date>
29       </publicationStmt>
30       <sourceDesc>
31         <listBibl xml:lang="la">
32           <biblStruct>
33             <monogr>
34               <title>Fragmenta Historicorum Graecorum</title>
35               <editor>
36                 <persName>
37                   <name xml:lang="la">Carolus Mullerus</name>
38                   <addName xml:lang="de">Karl Müller</addName>
39                 </persName>
40               </editor>
41               <author>
42                 <ref target="##URL##" cRef="##CITE_URN##">##author##</
      ref>
43               </author>
44               <imprint>
45                 <publisher>Ambroise Firmin-Didot</publisher>
```

```
46              <pubPlace>Paris, France</pubPlace>
47              <date>##volume_date##</date>
48            </imprint>
49            <biblScope unit="volume">##volume##</biblScope>
50          </monogr>
51          <ref target="https://archive.org/details/##internet_archive
      ##">Internet Archive</ref>
52          </biblStruct>
53        </listBibl>
54      </sourceDesc>
55    </fileDesc>
56    <encodingDesc>
57      <p>This file is automatically generated starting from data stored
      in an SQL DB.</p>
58      <p>The following text is encoded in accordance with EpiDoc
      standards and with the CTS/CITE Architecture.</p>
59    </encodingDesc>
60    <profileDesc>
61      <langUsage>
62        <language ident="la">Latin</language>
63        <language ident="grc">Greek</language>##additional_language##
64      </langUsage>
65    </profileDesc>
66  </teiHeader>
67  <text>
68    <body>
```

The attributes `@target` and `@cRef` in the element `<ref>` include a URL with a LOFTS URN of the relevant FHG author and the corresponding CITE URN. URNs are not part of the DFHG database and are generated by a PHP script and added to the EpiDoc TEI header.[139] The structure of the element `<body>` of each EpiDoc TEI XML file represents the structure of the FHG and follows the main distinction between sources that are classified as `fragment` and as `extant text`. Data is extracted from the DFHG database and exported in corresponding TEI elements. Texts classified as `fragment` are encoded with the following structure:

```
1  <text>
2    <body>
3      <div type="edition" subtype="volume" n="##volume_number##">
4        <head>
5          <title><ref target="##URL##">##volume##</ref></title>
6        </head>
7        <div type="textpart" subtype="sub_volume">
8          <head>
9            <title>##sub_volume##</title>
```

---

139 For a detailed description of LOFTS URNs and CITE URNs, see section 4.3.5.

```
10        </head>
11        <div type="textpart" subtype="section">
12          <head>
13            <title><ref target="##URL##">##section##</ref></title>
14          </head>
15          <div type="textpart" subtype="work">
16            <ab>
17              <title><ref target="##URL##">##work##</ref></title>
18            </ab>
19            <div type="textpart" subtype="work_section">
20              <ab>
21                <title><ref target="##URL##">##work_section##</ref></title>
22              </ab>
23              <div type="textpart">
24                <cit n="##fragment_number####fragment_letter##" rend="##fragment_note##"><ref target="##URL##">
25                  <bibl>##witness##</bibl>
26                  <quote>##text##</quote>
27                  <note type="translation">##translation##</note>
28                  <note type="commentary">##commentry##</note>
29                </ref>
30              </cit>
31            </div>
32          </div>
33        </div>
34      </div>
35    </div>
36  </div>
37  <pb n="##page##"/>
38 </body>
39 </text>
```

Texts classified as extant text are encoded with the following structure:

```
1 <text>
2   <body>
3     <div type="edition" subtype="volume" n="##volume_number##">
4       <head>
5         <title><ref target="##URL##">##volume##</ref></title>
6       </head>
7       <div type="textpart" subtype="sub_volume">
8         <head>
9           <title>##sub_volume##</title>
10        </head>
11        <div type="textpart" subtype="section">
12          <head>
13            <title><ref target="##URL##">##section##</ref></title>
```

```
14          </head>
15        <div type="textpart" subtype="work">
16          <ab>
17            <title><ref target="##URL#">##work##</ref></title>
18          </ab>
19          <div type="textpart" subtype="work_section">
20            <ab>
21              <title><ref target="##URL##">##work_section##</ref></title>
22            </ab>
23            <div type="textpart" subtype="book">
24              <ab>
25                <title><ref target="##URL##">##book##</ref></title>
26              </ab>
27              <div type="textpart" subtype="chapter">
28                <ab>
29                  <title><ref target="##URL#">##chapter##</ref></title>
30                </ab>
31                <div type="textpart">
32                  <p n="##section_number####sub_section_number##"><ref target="##URL##">##text##
33                    <note type="translation">##translation##</note></ref>
34                  </p>
35                </div>
36              </div>
37            </div>
38          </div>
39        </div>
40      </div>
41    </div>
42    <pb n="##page##"/>
43  </body>
44 </text>
```

The attribute `@target` in the element `<ref>` embeds URLs with LOFTS URNs that point to the relevant level of the structure of each FHG text. URNs are not part of the DFHG database and are generated by a PHP script and added to the EpiDoc TEI XML output. The focus of the project is to export information about source texts and therefore notes to subvolumes, works, work sections, books and commentaries are not extracted from the database. Numbers that refer to subsections (e.g., subsection 1 of Apollod., *Bibl.* 1.9.13) are included in the attribute `@n` of the element `<p>`. Letters that disambiguate fragment numbers and non-alphabetic characters added to fragment numbers to mean uncertainty are included in the attributes `@n` and `@rend` of the element `<cit>`.[140] Due to their extent, commentaries

---

140 See p. 151 nn. 51 and 52.

to texts are not included in EpiDoc TEI XML outputs of texts classified as `extant text`.

Well formed XML files have a structure which is mainly focused on FHG source texts. In this case element names correspond to those of the fields of the DFHG database.[141] Every XML file shares the same Header with information about the project and the relevant file name that corresponds to one FHG author name:

```
1  <DFHG>
2    <header>
3      <title project_url="http://www.dfhg-project.org/">Digital Fragmenta
          Historicorum Graecorum</title>
4      <editor_in_chief>Monica Berti</editor_in_chief>
5      <funder>Alexander von Humboldt Stiftung</funder>
6      <licence target="http://creativecommons.org/licenses/by-sa/4.0/">
        Available under a Creative Commons Attribution-ShareAlike 4.0
        International License</licence>
7      <institution>University of Leipzig</institution>
8      <place>Germany</place>
9      <date>2017</date>
10     <filename>##file_name##</filename>
11     <note>This file is automatically generated from data stored in an
        SQL DB queried by a PHP script</note>
12   </header>
13  </DFHG>
```

Texts classified as `fragment` are encoded with the following structure:

```
1  <fragment id="##fragment_number##" dfhg_id="##dfhg_id##" lofts_urn="##
        URN##" cite_urn="##CITE_URN##">
2    <volume>##volume##</volume>
3    <sub_volume>##sub_volume##</sub_volume>
4    <sub_volume_note>##sub_volume_note##</sub_volume_note>
5    <author>##author##</author>
6    <section>##section##</section>
7    <work>##work##</work>
8    <work_note>##work_note##</work_note>
9    <work_section>##work_section</work_section>
10   <work_section_note>##work_section_note##</work_section_note>
11   <book>##book##</book>
12   <book_note>##book_note##</book_note>
13   <fragment_number>##fragment_number##</fragment_number>
14   <fragment_letter>##fragment_letter##</fragment_letter>
15   <fragment_note>##fragment_note##</fragment_note>
16   <witness>##witness##</witness>
```

---

141 Well formed XML files are available at https://dfhg-project.github.io.

```
17    <text>##text##</text>
18    <translation>##translation##</translation>
19    <commentary>##commentary##</commentary>
20    <note>##note##</note>
21    <page>##page##</page>
22  </fragment>
```

The element `<fragment>` includes attributes with the number of the FHG fragment, the ID from the DFHG database, the LOFTS URN and the corresponding CITE URN.[142] Texts classified as `extant text` are encoded with the following structure:

```
1  <extant_text id="##extant_text_id##" dfhg_id="##dfhg_id##" lofts_urn="
       ##URN##" cite_urn="##CITE_URN##">
2    <volume>##volume##</volume>
3    <sub_volume>##sub_volume##</sub_volume>
4    <sub_volume_note>##sub_volume_note##</sub_volume_note>
5    <author>##author##</author>
6    <section>##section##</section>
7    <work>##work##</work>
8    <work_note>##work_note##</work_note>
9    <work_section>##work_section##</work_section>
10   <work_section_note>##work_section_note##</work_section_note>
11   <book>##book##</book>
12   <book_note>##book_note##</book_note>
13   <chapter>##chapter##</chapter>
14   <section>##section##</section>
15   <sub_section>##sub_section##</sub_section>
16   <text>##text##</text>
17   <translation>##translation##</translation>
18   <commentary>##commentary##</commentary>
19   <note>##note##</note>
20   <page>##page##</page>
21  </extant_text>
```

The element `<extant text>` includes attributes with and ID that corresponds to the sequence of the relevant FHG text in the XML file, the ID from the DFHG database, the LOFTS URN and the corresponding CITE URN.[143] The structure of these files is much simpler than that of the EpiDoc TEI XMl files, represents the structure of the DFHG database, and allows scholars to easily extract information about sources collected in the printed edition of the FHG.

---

142 Disambiguating letters and non-alphabetic characters added to fragment numbers are included in their own elements in the XML file. On the importance of the DFHG ID for keeping track of the original sequence of source texts in the FHG collection, see p. 148 n. 45.

143 Numbers of books, chapters, sections and subsections are included in their own elements in the XML file.

4.4 DFHG Add-ons

The DFHG project not only offers access to its data with the tools and services described in the previous sections, but also expands and connects it with external collections in order to produce further data that in the future will contribute to the creation of new resources for the study of fragmentary historiography and in general of fragmentary literature. Figure 4.17 shows the icons of the add-ons of the DFHG project: 1) the *Fragmentary Authors Catalog* and the *Witnesses Catalog* aim at building and expanding a catalog of ancient Greek fragmentary historians and of their witnesses; 2) the *Müller-Jacoby Table of Concordance* is the first complete concordance of ancient Greek fragmentary historians published in the *Fragmenta Historicorum Graecorum* and in *Die Fragmente der griechischen Historiker* including the *continuatio* and the *Brill's New Jacoby*; 3) *OCR Editing* offers a web-based tool for OCR post-correction; 4) *Text Reuse Detection* is an experiment for applying text reuse detection techniques to the collection of the *Fragmenta Historicorum Graecorum*; 5) at the time of writing, the DFHG project is experimenting Named Entity Recognition and the creation of a complete Thesaurus of Greek and Latin data of the *Fragmenta Historicorum Graecorum*.
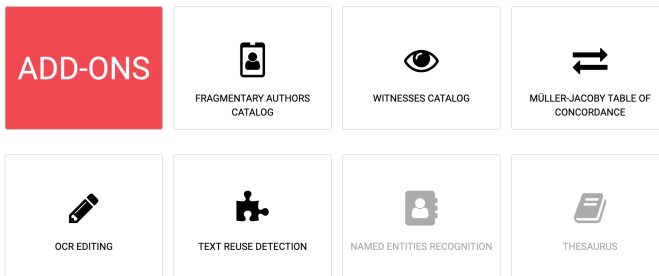
Figure 4.17. DFHG add-ons

4.4.1 Fragmentary Authors Catalog

The DFHG *Fragmentary Authors Catalog* is an add-on for searching the 636 Greek fragmentary historians of the *Fragmenta Historicorum Graecorum* and for getting an overview about *where* and *how* these authors are arranged in the collection.[144] This resource is complementary to the other tools of the DFHG Project and can be consulted in conjunction with the *index auctorum* and the *index tit-*

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144 http://www.dfhg-project.org/Fragmentary-Authors-Catalog/

ulorum printed at the end of FHG IV (671–678 and 679–698). Search fields of the DFHG *Fragmentary Authors Catalog* are `Author` (e.g., Hippys Rheginus) and `Volume` of the FHG (e.g., FHG 2). The Output displays the following data, if available:

- `FHG Volume`: e.g., FHG 1;
- `FHG Sub_Volume`: e.g., Liber primus;
- `Historical period` of a group of FHG authors according to the classification of Karl Müller: e.g., *Inde ab incunabulis artis historicae usque ad finem Belli Peloponnesiaci*;
- `Date` of the historical period of a group of FHG authors according to the chronology of Karl Müller: e.g., 520–404 B.C.;
- `FHG Author` with a link to the DFHG author page: e.g., Critias Atheniensis (http://www.dfhg-project.org/DFHG/index.php?volume=Volumensecundum#urn:lofts:fhg.2.critias_atheniensis);
- `FHG pages` with a link to the printed edition of the FHG available through *Internet Archive*: e.g., 68–71 (https://archive.org/stream/fragmentahistori02mueluoft#page/68/mode/1up);
- `CITE URN` of each FHG author: e.g., `urn:cite:lofts:fhg.1.hellanicus`;
- `Place` corresponding to the geographical epithet of each FHG author according to the language of Karl Müller and with links to Canonical URIs of the *Pleiades* gazetteer: e.g., Athenae (https://pleiades.stoa.org/places/579885).

The catalog has been produced semi-automatically by combining DFHG data with new data and by structuring them in the following fields (records are about the FHG author *Dionysius Rhodius sive Samius*):

1. `id`: 29
2. `FHG vol.`: FHG 2
3. `FHG sub_volume`: Liber primus
4. `FHG Date_description`: Inde ab incunabulis artis historicae usque ad finem Belli Peloponnesiaci
5. `FHG Date`: 520–404 B.C.
6. `FHG author`: Dionysius Rhodius sive Samius
7. `FHG pages`: 9–11
8. `FHG archive.org URL`: https://archive.org/stream/fragmentahistori02mueluoft#page/9/mode/1up
9. `DFHG URL`: http://www.dfhg-project.org/DFHG/index.php?volume=Volumensecundum#urn:lofts:fhg.2.dionysius_rhodius_sive_samius
10. `DFHG CITE URN`: `urn:cite:lofts:fhg.2.dionysius_rhodius_sive_samius`
11. `Geographical_epithet1`: Rhodius

12. `Geographical_epithet2`: Samius[145]
13. `Place1`: Rhodes
14. `Place2`: Samos
15. `Pleiades_URI1`: https://pleiades.stoa.org/places/590031
16. `Latitude1`: 36.195597
17. `Longitude1`: 27.964125
18. `Pleiades_URI2`: https://pleiades.stoa.org/places/599926
19. `Latitude2`: 37.73
20. `Longitude2`: 26.84

Figure 4.18 shows how these records are displayed in the web page of the catalog, which is available through the following link:

`http://www.dfhg-project.org/Fragmentary-Authors-Catalog/index.php?what[]=`
`author|Dionysius+Rhodius+sive+Samius&onoffswitch=on`

VOLUME	SUB VOLUME	HISTORICAL PERIOD	DATE	AUTHOR	PAGES	CITE URN	PLACES
FHG 2	Liber primus	Inde ab incunabulis artis historicae usque ad finem Belli Peloponnesiaci	520-404 B.C.	Dionysius Rhodius sive Samius	9-11	urn:cite:lofts:fhg.2.dionysius_rhodius_sive_samius	Rhodes Samos

Figure 4.18. DFHG *Fragmentary Authors Catalog*: Dionysius Rhodius sive Samius

The goal of the catalog is to collect data about the exact location of authors in the FHG, their chronology according to the arrangement of the FHG, pages with links to the digital and the printed version of the FHG, canonical citations of DFHG authors according to the *CITE Architecture*, and places corresponding to the geographical epithet of each FHG author used by Müller.[146]

Records in the fields `FHG Date_description` and `FHG Date` have been extracted from the descriptions of FHG subvolumes. These records preserve the language of Karl Müller to describe the ten books (*libri*) of FHG II–IV: see pp. 129 ff. They cover a period of time from archaic Greece to the reign of the emperor Phocas. Book three (*Liber tertius*) is a section with authors from Aristoteles to his disciples (*Aristoteles ejusque discipuli*), while book ten (*Liber decimus*) includes a big group of authors of uncertain age arranged in alpabetical order (*Scriptores aetatis incertae ex ordine literarum*).

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145 The author has two geographical epithets because this is how he is attested in the *Suda* ([Δ 1181] s.v. Διονύσιος, Μουσωνίου, Ῥόδιος ἢ Σάμιος, ἱστορικός [...]). In the FGrHist and in the BNJ, the FHG author has been split in two different authors: Dionysios von Samos (der Kyklograph) (15) and Dionysios von Rhodos (511).

146 Links to the *Perseus Catalog* have not been added because they are already part of the *Müller-Jacoby Table of Concordance*: see section 4.4.3. The distribution of authors in the FHG can be visualized and exported through the DFHG *Fragmentary Authors Catalog Chart*: see section 4.4.1.2.

Latin chronological descriptions are available for every book, while numerical forms of dates (e.g., 520–404 B.C.) are available only for book 1 and books 4–9.[147] Chronological data is missing for FHG I, the first part of FHG II (*De insidiis quae regibus structae sunt excerpta*), the appendix of FHG IV (*Appendix ad librum nonum*), and FHG V (*pars prior* and *pars altera*). Except for FHG I, filling in this missing data is not the goal of the DFHG, because the project aims — as far as possible — at a faithful representation of the editorial work of Karl Müller. On the other side, the reason for extracting chronological data from the FHG is an experiment to make it available and to eventually connect it with external resources (see below).

Records in the field `Geographical_epithet` correspond to the geographical adjectives added by Müller to author names. These adjectives have been used to obtain place names (`Place`) in order to query place resources of the *Pleiades* gazetteer for obtaining canonical URIs (`Pleiades_URI`) and geographical coordinates (`Latitude` and `Longitude`) of places connected to FHG authors. The reason for providing two places (`Place1` and `Place2`) is due to the fact that there are four cases in the FHG with two geographical epithets: *Dionysius Rhodius sive Samius* (FHG II 9–11), *Menodotus Perinthius vel Samius* (FHG III 103–105), *Magnus Carrhenus. Eutychianus Cappadox* (FHG IV 4–6) and *Agathocles Cyzicenus vel Babylonius* (FHG IV 288–290).[148] The catalog reveals that there are 365 author names with geographical epithets out of a total of 636 FHG authors.[149] The collection contains the following 184 unique geographical epithets:[150]

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147 These numerical forms are part of the FHG Latin descriptions and have been extracted to generate a separate field in the database.

148 The fact that the authors Magnus Carrhenus and Euthychianus Cappadox are together depends on the arrangement of Karl Müller, who published one single passage from the *Chronographia* of Joannes Malalas (p. 328, 20 – 333, 6 ed. Dindorf) under the headings *Magnus Carrhenus. Eutychianus Cappadox* and *Magni et Eutychiani fragmenta*. The passage of Malalas includes two sequent sections derived from Magnus Carrhenus (Μάγνος ὁ χρονογράφος ὁ Καρηνός) and Euthychianus Cappadox (Εὐτυχιανὸς ὁ χρονογράφος ὁ Καππάδοξ). The fragment is not numbered in the FHG collection. The passage has been split and the two authors have been published in two separate parts in the FGrHist and in the BNJ: 225 and 226. The concordance among these editions can be obtained by searching the *Müller-Jacoby Table of Concordance*: see section 4.4.3. The decision of the DFHG project not to split the passage of Malalas and to keep the two authors together as published in the FHG is of course questionable, but the first goal of the DFHG project is to preserve the editorial decisions of Karl Müller with their ambiguities and complexities.

149 For the complete list of FHG authors, see pp. 128 ff.

150 Author names of FHG I don't have geographical epithets, but corresponding places have been added in the DFHG *Fragmentary Authors Catalog* because there is a general agreement on them in modern scholarship and because I wanted to include them in the DFHG *Fragmentary Authors Map* (see section 4.4.1.1). As for other volumes, missing geographical epithets in the FHG correspond to missing places in the DFHG.

Abderita, Abydenus, Acanthius, Acharnenses, Agrigentinus, Alabandensis, Alexandrensis, Alexandrinus, Alexandrinus e Troade, Amasensis, Amastrianus, Amphipolita, Anaeus, Anazarbensis, Andriensis, Antiochenus, Apamensis, Aphrodisiensis, Arelatensis, Argivus, Artemiten, Ascalonita, Atheniensis, Babylonius, Barcaeus, Batiensis, Berytius, Bithynus, Boeotus, Bosporanus, Byblius, Byzantius, Caesariensis, Calactinus, Callatianus, Cappadox, Cardianus, Carrhenus, Carthaginiensis, Caryandensis, Carystius, Cassandrensis, Ceus, Chalcedonius, Chalcidensis, Chaldaeus, Chius, Chorenensis, Cittiensis, Clagensis, Clazomenius, Cnidius, Cnossius, Colonensis, Colophonius, Corinthius, Cous, Cumanus, Cyprius, Cyrenaeus, Cythnius, Cyzicenus, Damascenus, Delius, Delphus, Dyrrachinus, Edessenus, Elaita, Eleus, Emesenus, Ephesius, Epidauria, Epiphaniensis, Epirota, Eresius, Eretriensis, Erythraeus, Euboeus, Gadarenus, Halicarnassensis, Heracleensis, Heracleota, Hierapolita, Iliensis, Isaurus, Lacedaemonius, Laco, Lampsacenus, Lepreates, Lesbius, Leucadius, Leuconoensis, Lindius, Liparaeus, Lycius, Lydius, Macedo, Magnesius, Maleotes, Mallotes, Mamigonensis, Mantinensis, Mauritanus, Mecybernaeus, Megalopolitanus, Mendesius, Mesopotamenus, Messenius, Methymnaeus, Milesius, Myndius, Myrleanus, Mytilenaeus, Naucratita, Naucratites, Neapolitanus, Nicaeensis, Nicomedensis, Nisibenus, Nysaensis, Oasita, Odessanus, Oechaliensis, Olbiopolita, Olynthius, Panites, Panormitanus, Parius, Patrensis, Pellaeus, Peparethius, Pergamenus, Perinthius, Petraeus, Phalereus, Phaselita, Philadelphensis, Pieriota, Plataeensis, Pompeiopolitanus, Ponticus, Prienensis, Proconnesius, Pygelensis, Rheginus, Rhodius, Rosettanus, Sagalassensis, Salaminius, Samius, Samothrax, Sardianus, Scepsius, Sebennyta, Siculus, Sicyonius, Sigeensis, Sinopensis, Solensis, Stymphalius, Syracusanus, Tarentinus, Tarrhaeus, Tarsensis, Tauromenitanus, Tegeata, Teius, Tejus, Tenedius, Thasius, Theangelensis, Thebaeus, Thebanus, Thespiensis, Thessalus, Thrax, Thyatirenus, Tiberiensis, Tragilensis, Trallianus, Trapezuntius, Troezenius, Tyrius, Xanthius

These geographical epithets correspond to the following 178 places:

Abdera, Abydos, Acharnai, Agrigentum, Akanthos, Alabanda, Alexandria, Alexandria Troas, Amaseia, Amastris, Amphipolis, Anaia, Anazarbos, Andria (Elis), Antiochia, Apamea, Aphrodisias, Arelate, Argos, Artemita, Ascalon, Athenae, Babylonia, Barca, Bate, Berytus, Bithynia, Boeotia, Bosporus, Byblos, Byzantium, Caesarea, Calacte, Callatis, Cappadocia, Carrhae, Carthago, Chalcis, Chaldaea, Chalkedon, Chios, Chorene, Cnidus, Colophon, Corinthus, Cyme, Cyprus, Cyrene, Cyzicus, Damascus, Delos, Delphi, Dyrrachium, Edessa, Elaea, Elis, Emesa, Ephesos, Epidauros, Epiphaneia, Epirus, Eresos, Eretria, Erythrai, Euboea, Gadara, Glak, Halicarnassus, Herakleia, Hierapolis, Ilium, Isauria, Kardia, Karyanda, Karystos, Kassandreia, Keos, Kition, Klazomenai, Knosos, Kolonai, Kos, Kythnos, Lacedaemon, Lampsacus, Lepreon, Lesbos, Leucas, Leukonoion, Lindos, Lipara, Lycia, Lydia, Macedonia, Mallos, Mamiki, Mantineia, Mauritania, Megalopolis, Mekyberna, Mende, Mesopotamia, Messene, Methymna, Mgnesia, Miletus, Myndos, Myrleia, Mytilene, Naucratis, Neapolis, Nicaea, Nicomedia, Nisibis, Nysa, Oasis Magna, Odessos, Oichalia, Olbia, Olynthus, Panion, Panormus, Paros, Patrai, Pella, Peparethus, Pergamum, Perinthus, Petra, Phaleron, Phaselis, Philadelpheia, Pieria, Plataea, Pompeiopolis, Pontus Euxinus, Priene, Proconnesus, Pygela, Rhegion, Rhodes, Rosetta, Sagalassos, Salamis, Samos, Samothrace, Sardis, Sebennytos, Sicilia, Sicyon, Sigeion, Sinope, Skepsis, Soloi, Stymphalos, Syracusae, Tarentum, Tarra, Tarsos,

Tauromenium, Tegea, Tenedos, Teos, Thasos, Theangela, Thebae, Thebai, Thespiai, Thessalia, Thracia, Thyateira, Tiberias, Tragilos, Tralles, Trapezus, Troizen, Tyrus, Xanthos

The six differences between the two lists are due to few inconsistencies of geographical epithets in the FHG.[151] Place names have been manually generated from the geographical epithets and their forms correspond to the forms used for place resource entries in the *Pleiades* gazetteer.[152] Each *Pleiades* entry has a *Pleiades* Canonical URI with metadata and corresponding *representative points* (latitude and longitude) that have been used to generate the DFHG *Fragmentary Authors Map* described in section 4.4.1.1.[153]

The principle for producing the correspondence between geographical epithets and *Pleiades* places has been guided by the goal of representing interpretations and conclusions of the editor of the FHG. Latin geographical epithets of author names have been *converted* into corresponding *Pleiades* places. FHG commentaries to authors have been consulted to check the correctness of the correspondences and solve ambiguites.[154] Of course many other places could have been added to FHG authors in accordance with information collected in the FHG, but such an effort was out of the scope of the DFHG *Fragmentary Authors Catalog* and would have required too much manual work for extracting this data from commentaries and from notes of the FHG collection.[155]

Ambiguities and uncertainties are inevitable because they are present in the sources about fragmentary authors and because connecting places to ancient authors can be extremely complex.[156] The DFHG project has decided to begin to follow those elements of the FHG that are more visible and not ambiguous, such as the epithets that are part of author names in the collection.

In any case, the database of the DFHG *Fragmentary Authors Catalog* can be edited and expanded, and data is automatically updated and ingested also in the

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151 *Alexandrensis* and *Alexandrinus e Troade* for *Alexandria Troas*, *Heracleensis* and *Heracleota* for *Herakleia*, *Lacedaemonius* and *Laco* for *Lacedaemon*, *Maleotes* and *Mallotes* for *Mallos*, *Naucratita* and *Naucratites* for *Naucratis*, *Teius* and *Tejus* for *Teos*.

152 On the distinction among *Places*, *Locations*, and *Names* in *Pleiades*, see Cayless (2019) 38.

153 *Pleiades* Canonical URIs have been identified for every place corresponding to a geographical epithet of FHG authors, except for the epithets *Oechaliensis* (*Linus Oechaliensis*, FHG IV 439) and *Pygelensis* (*Democles Pygelensis*, FHG II 20–21). In the first case the Greek form of the epithet is Οἰχαλιώτης and the corresponding place name is Οἰχαλία (see Steph. Byz., s.v. Οἰχαλία), but it is not possible to identify which of the ancient places with this name is connected to Linus (cf. FHG IV 439). In the second case the place is Πύγελα, but it doesn't have any entries in the *Pleiades* gazetteer.

154 For example in the case of the use of the epithet *Alexandreensis* for the place *Alexandria Troas*.

155 An example is Apion Oasita, whose epithet corresponds to his place of birth (*Oasis Magna*). Sources attest his activity in Alexandria (cf. FHG III 506) and Felix Jacoby labels the author as *Apion von Oasis und Alexandreia* (FGrHist 616) and *Apion Oasis/Alexandria* (FGrHist 1057). BNJ 616 has only *Apion of Alexandria*.

156 Cf. below n. 159.

DFHG *Fragmentary Authors Map* and in the *Chart*. Other digital resources provide chronological and geographical data for ancient Greek fragmentary historians. The project *Jacoby Online* offers this data for the *Brill's New Jacoby*. The guidelines of the BNJ have a section for metadata about fragmentary authors including `Historian's date` and `Place of origin`. An example is Deinon of Kolophon (BNJ 690), who is dated to the "4th century BC" (`Historian's date`) and whose origin is located in "Asia Minor" (`Place of origin`).[157] The language of the project and therefore of places and dates is English. The guidelines of the BNJ precise that the field `Historian's date` may contain exact dates (e.g., "99 BC"), general descriptions (e.g., "Hellenistic Period"), and centuries (e.g., "5th century BC"). In order to be found in the search engine, general descriptions must be converted into centuries (e.g., "Hellenistic period" becomes "3rd–1st century BC"), centuries can't include further specifications (e.g., "early 4th century AD" becomes "4th century AD") and have to be expressed with ordinal numbers (e.g., "4th century AD"). Beside centuries, a few other values are permitted, like "c.", "unknown", "various" (only for *scholia*), "mythical past". These provisions are part of the last guidelines distributed to BNJ contributors (2019). In the first edition of the BNJ most of the times the field `Place of origin` is left empty, while in the second edition is filled in if it is known: see the example of Demetrios of Byzantion in the first and in the second edition of BNJ 162. All this data can be visualized through the BNJ web page and can be searched with its search engine, but is not exportable or accessible through stantardized file formats or an API.

The *Canon of Greek Authors and Works* of the *Thesaurus Linguae Graecae* provides dates and geographical epithets for its authors, including fragmentary historians (see pp. 18 ff). The field `Date` includes "the century of an author's life or *floruit*" and its values are expressed in English with Arabic numerals for centuries, the abbreviations B.C. and A.D., and other elements to indicate a *terminus ante quem*, a *terminus post quem*, and uncertain chronology (with a question mark or the Latin adjective *incertum*).[158] The field `Geographic epithet` provides information about "the place of birth or literary activity" of an author, when it

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157 See http://dx.doi.org/10.1163/1873-5363_bnj_a690.

158 For a detailed description of dates in the TLG *Canon*, see Berkowitz/Squitier (1990) xix–xx: "Thus, dates — with all of the imperfections and speculativeness that they imply — have become a fixture of the canon, sometimes functioning as an organizing principle in responding to certain requestes for information from the data bank." Information and updates of the *Canon* are now available on the TLG website.

is possible and reasonable to find and add these pieces of data.[159] Also in this case, like for the BNJ, data can be only visualized and searched through the TLG website, but not exported and accessible with an API.

The *Perseus Catalog* provides chronological and geographical data about authors, including fragmentary ones. If available, these pieces of information are part of the name of the author in the *Authority Record*, as for example "Hellanicus of Lesbos"[160] or "Ister Cyrenaeus 3. Jh. v. Chr".[161] The web page of the authority record of the catalog doesn't display these pieces of data in separate fields, but they are accessible in the metadata of the catalog, which is available as bibliographic records for editions/translations of works and as authority records for its authors/textgroups. Metadata is represented according to two standards from the *Library of Congress* (LC): the MODS (*Metadata Object Description Standard*) XML schema for bibliographic metadata and MADS (*Metadata Authority Description Standard*) for all authority records.[162] Perseus MADS XML files include elements to mark up also geographical epithets and chronological data of authors. The following one is the MADS XML file of Ister Cyrenaeus, where the element `<mads:authority>` nests the elements `<mads:name>` and `<mads:namePart>` that encode in the attribute `@type` the geographical epithet *Cyrenaeus* (`"termsOfAddress"`) and his chronology *3. Jh. v. Chr* (`"date"`), whose forms are expressed in accordance with the record of the *Virtual International Authority File* (VIAF):[163]

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159 On the difficulties of providing geographical epithets, see Berkowitz/Squitier (1990) xx–xxii: "Obviously, it is impossible to provide an appropriate geographical epithet for every author, although in some cases it is possible to suggest two or three places associated with an author's *floruit*. The inadequacy of geographical epithets lies in their failure to distinguish place of birth from place of literary activity or place of residence in an official or ecclesiastical capacity. [...] An effort to be exhaustive in charting the lives and activities of authors in terms of geographical epithets would be doomed to failure in most cases and altogether absurd in many others. [...] Geographical epithets can be especially useful for the purposes of the *Canon* if they are used to distinguish authors of the same name [...] systematic assignment of geographical epithets remains a task for more leisurely days in the future. In the meantime, those that do appear in this edition are the result of either a fairly firm tradition (including a firm tradition of uncertainty) or a need to distinguish one author from another. There are, moreover, many authors whose geographical connections we can only surmise. [...] Finally, there are many authors whose geographical connections we cannot possibly guess. When this is so, the space allotted for geographical epithets remains blank."

160 https://catalog.perseus.org/catalog/urn:cite:perseus:author.701

161 https://catalog.perseus.org/catalog/urn:cite:perseus:author.776

162 For a detailed description see Babeu (2008), Babeu (2012), and Babeu (2019). MODS and MADS XML files of the *Perseus Catalog* are openly accessible in the GitHub repository of the *Perseus Digital Library*: https://github.com/PerseusDL/catalog_data.

163 On the contribution of the *Perseus Catalog* to VIAF, see p. 403 n. 157.

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       loc.gov/mads/v2 http://www.loc.gov/standards/mads/mads.xsd">
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6        <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
7      </mads:name>
8    </mads:authority>
9    <mads:related type="equivalent" lang="grc">
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11       <mads:namePart>&#x1F3C;&#x3C3;&#x3C4;&#x3C1;&#x3BF;&#x3C2;</mads:
         namePart>
12     </mads:name>
13   </mads:related>
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36     </mads:name>
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55      </mads:name>
56    </mads:variant>
57    <mads:variant type="other">
58      <mads:name type="personal">
59        <mads:namePart>Istros</mads:namePart>
60        <mads:namePart type="termsOfAddress">Kallimachos-Sch&#xFC;ler</
      mads:namePart>
61        <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
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63    </mads:variant>
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67        <mads:namePart type="termsOfAddress">der Kallimacheer</mads:
      namePart>
68        <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
69      </mads:name>
70    </mads:variant>
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74        <mads:namePart type="termsOfAddress">von Kyrene</mads:namePart>
75        <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
76      </mads:name>
77    </mads:variant>
78    <mads:variant type="other" lang="ita">
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81        <mads:namePart type="termsOfAddress">Scolaro di Callimaco</mads:
      namePart>
82        <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
83      </mads:name>
84    </mads:variant>
85    <mads:variant type="other" lang="ita">
86      <mads:name type="personal">
87        <mads:namePart>Istro</mads:namePart>
88        <mads:namePart type="termsOfAddress">di Cirene</mads:namePart>
```

```
89            <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
90          </mads:name>
91        </mads:variant>
92        <mads:variant type="other" lang="ita">
93          <mads:name type="personal">
94            <mads:namePart>Istro</mads:namePart>
95            <mads:namePart type="termsOfAddress">il Callimacheo</mads:
              namePart>
96            <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
97          </mads:name>
98        </mads:variant>
99        <mads:variant type="other" lang="lat">
100         <mads:name type="personal">
101           <mads:namePart>Istrus</mads:namePart>
102           <mads:namePart type="termsOfAddress">Cyrenaeus</mads:namePart>
103           <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
104         </mads:name>
105       </mads:variant>
106       <mads:variant type="other" lang="lat">
107         <mads:name type="personal">
108           <mads:namePart>Istrus</mads:namePart>
109           <mads:namePart type="termsOfAddress">Cyrenaicus</mads:namePart>
110           <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
111         </mads:name>
112       </mads:variant>
113       <mads:variant type="other" lang="lat">
114         <mads:name type="personal">
115           <mads:namePart>Istrus</mads:namePart>
116           <mads:namePart type="termsOfAddress">Historicus</mads:namePart>
117           <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
118         </mads:name>
119       </mads:variant>
120       <mads:variant type="other">
121         <mads:name type="personal">
122           <mads:namePart>Istrus</mads:namePart>
123           <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
124         </mads:name>
125       </mads:variant>
126       <mads:variant type="other">
127         <mads:name type="personal" authority="lsj">
128           <mads:namePart>Ister</mads:namePart>
129           <mads:namePart type="termsOfAddress">Historicus</mads:namePart>
130         </mads:name>
131       </mads:variant>
132       <mads:variant type="abbreviation">
133         <mads:name type="personal" authority="lsj">
134           <mads:namePart/>
135         </mads:name>
136       </mads:variant>
```

```
137    <mads:identifier type="citeurn">urn:cite:perseus:author.776.1</mads:
          identifier>
138    <mads:identifier type="uri">http://viaf.org/viaf/12652822</mads:
          identifier>
139    <mads:fieldOfActivity>Historian</mads:fieldOfActivity>
140
141    <mads:url displayLabel="Wikipedia">http://en.wikipedia.org/wiki/
          Istros_the_Callimachean</mads:url>
142    <mads:url displayLabel="Worldcat Identities">http://www.worldcat.org/
          wcidentities/lccn-no2002-7118</mads:url>
143    <mads:url displayLabel="Smith's Dictionary"/>
144    <mads:url displayLabel="VIAF">http://viaf.org/viaf/12652822</mads:url
          >
145    <mads:identifier type="tlg">1450</mads:identifier>
146    <mads:extension>
147      <mads:description>List of related work identifiers</mads:
          description>
148      <mads:identifier type="tlg">1450.004</mads:identifier>
149    </mads:extension>
150    <mads:extension>
151      <mads:gender>
152        <mads:genderTerm>unknown</mads:genderTerm>
153      </mads:gender>
154    </mads:extension>
155    <mads:recordInfo>
156      <mads:recordOrigin>Converted from MARCXML to MADS version 2.0 (
          Revision 2.10)</mads:recordOrigin>
157      <mads:recordContentSource authority="marcorg">VIAF</mads:
          recordContentSource>
158      <mads:recordIdentifier source="OCoLC">viaf12652822</mads:
          recordIdentifier>
159      <mads:descriptionStandard>other rules</mads:descriptionStandard>
160    </mads:recordInfo>
161  </mads:mads>
```

Assigning geographical epithets and dates to ancient authors is a very complex task. In spite of that, there are many reasons for experimenting with it, which depend on the kind of research questions a scholar tries to answer. In a digital environment, geographical and chronological information of historical data are now the target of ongoing projects and their treatment is important in order to generate outputs for statistical analyses and visualization tools.

For the geography of the ancient world, reference resources are the above mentioned *Pleiades* gazetteer and also the *Pelagios Network*, which aims at connecting "researchers, scientists and curators to link and explore the history of places" (https://pelagios.org).[164] As for the chronology, GODOT (*Graph of Dated Objects and Texts*) is a graph database system that aims at "creating and maintain-

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164 Elliott/Gillies (2009); Simon/Barker et al. (2017).

ing a gazetteer of calendar dates in different calendar systems, initially those used in Greek and Roman antiquity across the Mediterranean area, and providing links to attestations of these dates in online editions" (https://godot.date).[165] Another resource is *PeriodO*, which is "a public domain gazetteer of scholarly definitions of historical, art-historical, and archaeological periods. It eases the task of linking among datasets that define periods differently. It also helps scholars and students see where period definitions overlap or diverge" (https://perio.do).[166]

The complexity of the data is also due to the fact that there is a stratification of elements coming not only from primary sources, but also from secondary sources and scholarly editions. In the current state of the art, the DFHG project doesn't provide annotations of geographical and chronological expressions in the Greek and Latin texts collected in the FHG.[167] As of today, semantic annotations of this type can be performed, but they are out of the current scope of the project. Nevertheless and thanks to the DFHG, ancient Greek and Latin texts of the FHG are now available in a structured and machine readabale format, which means that linguistic analyses focusing on places and dates can be performed with external resources and by other scholars.

The goal of the DFHG *Fragmentary Authors Catalog* is to go beyond the collection of the *Fragmenta Historicorum Graecorum* and pose the foundation for the creation of a digital catalog of ancient Greek fragmentary historians and hopefully of ancient Greek and Latin fragmentary literature. As described in the previous pages, there are projects and resources partially providing this kind of information, but they are still quite different in terms of standardization and accessibility, which are significant issues that still limit a satisfying and complete integration of data. Data collected in the DFHG *Fragmentary Authors Catalog* is used to generate two further resources that are described in the following sections: 1) *Fragmentary Authors Map* and 2) *Fragmentary Authors Chart*.

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165 Grieshaber (2019).

166 Rabinowitz/Shaw et al. (2018).

167 An example of this language can be found in the *Suda* [A 2191]: Ἀνδροτίων, Ἄνδρωνος, Ἀθηναῖος, ῥήτωρ καὶ δημαγωγὸς, μαθητὴς Ἰσοκράτους. The adjective Ἀθηναῖος can be annotated as a reference to the place of origin and activity of Androtion, while the expression μαθητὴς Ἰσοκράτους can be converted into an approximate chronological span about his lifetime. This source is collected in the FHG not as a fragment, but as a textual evidence in the introduction to the life of the Atthidographer (FHG I, lxxxiii).

4.4.1.1 Fragmentary Authors Map

📖 Geographical coordinates of the catalog of FHG authors generate the DFHG *Fragmentary Authors Map*, which geolocates authors using *Google Maps*.[168] The map has a search engine with the complete list of FHG authors and their relevant places in square brackets (e.g., `Aretades Cnidius [Cnidus]`). Authors who are characterized by two geographical epithets — and therefore by two relevant places — are mapped in both locations (see the example of *Dionysius Rhodius sive Samius* at figure 4.20).
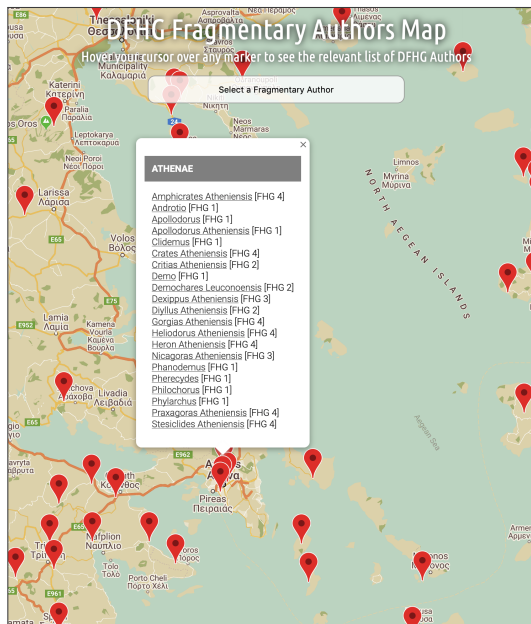
Figure 4.19. DFHG *Fragmentary Authors Map*: Athenae

By hovering the mouse over each *Google Maps* pin, a pop-up window opens with the list of FHG authors who are geolocated in that specific place. Every author is accompanied by his FHG volume number in square brackets. An example is the place *Athenae* at figure 4.19. By clicking an author name in the list, it is possible to open the corresponding web page of the author in the DFHG *Fragmentary Authors Catalog*. The map takes advantage of some of the *Google Maps* features. One of the more significant is the *marker clustering* that combines markers of closed proximity into clusters and simplify the display of the markers on the map. This feature allows users to visualize all the DFHG places and their distribution

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168 http://www.dfhg-project.org/Fragmentary-Authors-Catalog/map.php

Figure 4.20. DFHG *Fragmentary Authors Map*: fragmentary authors

on the map. Cluster colors, based on a heat map gradient, show even better the most represented regions in the FHG (fig. 4.21). By clicking on a cluster, users are able to zoom in the relevant region and visualize in details its places that may be further clustered or not. The DFHG *Fragmentary Authors Map* provides also a *map search* to look for a specific place, like for example *Syracusae*:[169] http://ww w.dfhg-project.org/Fragmentary-Authors-Catalog/map.php?center=Syracusae.
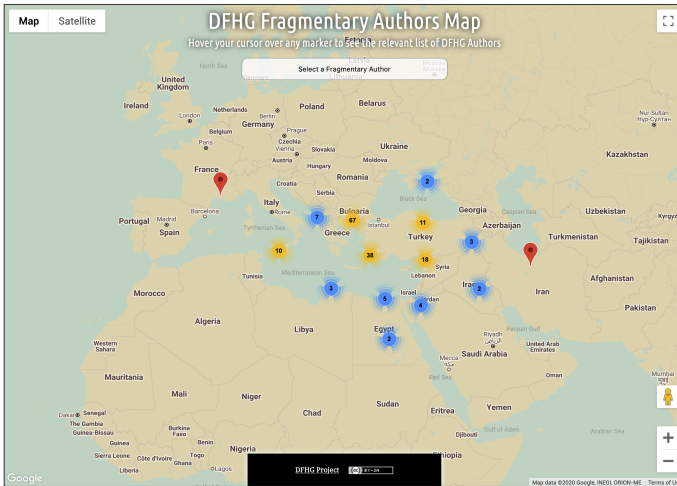
Figure 4.21. DFHG *Fragmentary Authors Map*: marker clustering

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169   In this case the place has to be added at the end of the URL.

The map is an experiment to visualize the geography of ancient Greek frag-
mentary historians. The project has not only a scholarly purpose, but also an
educational one to help students understand the complexities of locating ancient
historians and dealing with them in a digital environment. Many possible im-
plementations can be envisaged for such a project, as for example expanding it
to other collections of fragmentary authors, creating a historical *Google Maps*
through time, and adding more geographical annotations for each author.[170] As
for now, these implementations are out of the scope of the DFHG project, but
the experiment aims at making the community of scholars and students aware of
these possibilities and issues in order to address them in a proper and sustainable
way.[171]

4.4.1.2 Fragmentary Authors Chart

The arrangement and distribution of authors in the FHG can be visualized
through the DFHG *Fragmentary Authors Chart*.[172] The chart has been created
with *Highcharts* and can be exported to different formats, such as PNG image,
JPEG image, PDF document and SVG vector image. By hovering the mouse over
each blue bar corresponding to one of the fifteen FHG sections (`sub_volume`), it is
possible to visualize the list and the number of authors collected in it, as in the
example of figure 4.22 that shows the list of the eighteen authors of book 9 (*Liber
nonus*) of FHG IV.

4.4.2 Witnesses Catalog

The DFHG *Witnesses Catalog* is an add-on for searching authors and works
(*witnesses*) that preserve quotations and text reuses of the fragmentary historians
collected in the *Fragmenta Historicorum Graecorum*.[173] The reasons for producing
this resource depend on three different factors: 1) The *Fragmenta Historicorum
Graecorum* doesn't provide an index of the sources of the fragments and the DFHG
Witnesses Catalog aims at complementing it;[174] 2) Pierre Bonnechère published

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170 For experiments in this direction, see the *geography* of the *Digital Marmor Parium* in section
4.5.3.
171 On geodata and on the history and impact of *Geographic Information Systems* (GIS) and
related digital mapping technologies in humanities research, see Dunn (2019).
172 http://www.dfhg-project.org/Fragmentary-Authors-Catalog/authors_chart.php
173 http://www.dfhg-project.org/Witnesses-Catalog/
174 FHG IV has indices of fragmentary authors and works published in the first four volumes
of the collection, but not of their witnesses: see p. 141.
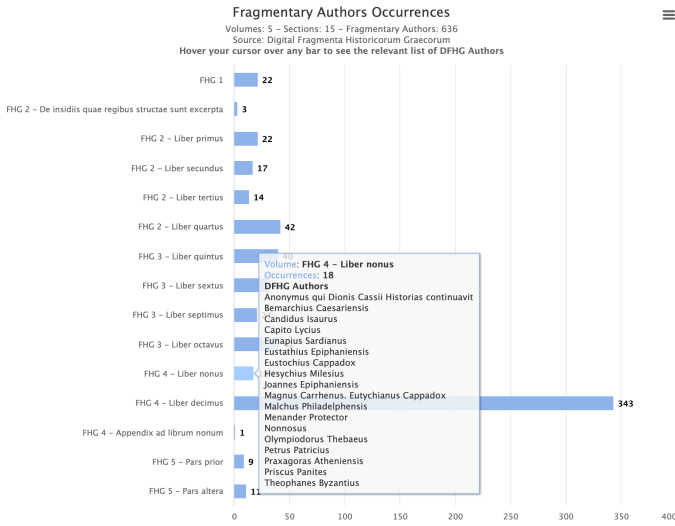
Figure 4.22. DFHG *Fragmentary Authors Chart*

three volumes of indexes of *Die Fragmente der griechischen Historiker* showing the importance of this kind of resource, but these volumes are only available in a printed output protected by copyright;[175] 3) metadata of the editions of the *Jacoby Online* project includes a `Source` field for expanded references to witnesses of fragments; given that the project is still in progress, witnesses of fragments are not yet available in a separate and structured database.[176]

The DFHG *Witnesses Catalog* provides a model for extracting and structuring information about source texts of historical fragments, in order to enrich them with stable machine readable bibliographic identifiers and connect them with external resources through other metadata. Search fields of the DFHG *Witnesses Catalog* are:

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175 See Bonnechère (1999), part. preface and introduction of vol. I on the necessity of the indexes and on the difficulties for creating them. The language of the indexes is Latin. The first volume (I) is an "alphabetical list of authors conserving *testimonia* and fragments", the second volume (II) is a "concordance Jacoby – source", and the third volume (III) is an "alphabetical list of fragmentary historians with alphabetical list of source-authors for each". On the work of Bonnechère see Marincola (2000).

176 See, for example, fragment 6 of Androtion of Athens (BNJ 324: http://dx.doi.org/10.1163/1 873-5363_bnj_a324). In this case the witness is an entry (Ἵππαρχος) from the *Lexicon* of Harpocration. The guidelines of the BNJ project request that references are expanded and made available in English. They should also include a reference to the edition consulted by the author of the BNJ entry. This last aspect is very important in order to know where the text of the witness comes from. This kind of information is generally not available in the FHG and in the FGrHist.

- `Authors` collected in the FHG: e.g., Phanodemus;
- `Works` of authors collected in the FHG: e.g., ATTIKA;
- `Witnesses (authors)` who preserve text reuses of FHG authors and works: e.g., Harpocration;
- `Witnesses (works)` that preserve text reuses of FHG authors and works: e.g., *Deipnosophistae*;
- `Editions` cited in the FHG as sources of fragments: e.g., Bekker. *Anecdota graeca* I. Berolini 1814;
- `Manuscripts` cited in the FHG as sources of fragments: e.g., *Codex Palatinus Graecus* 398;
- `Inscriptions` cited in the FHG as sources of fragments: e.g., CIG I 380.

The Ouptut displays the following data, if available:

- `Witnesses (authors)` who preserve text reuses of FHG authors and works (the list is arranged in alphabetical order): e.g., Herodotus;
- `Perseus Catalog Authors CITE urns`: e.g., `urn:cite:perseus:author.728`;
- `Literary and geographical epithets of witnesses (authors)` according to the TLG, the *Perseus Catalog*, *Pleiades* or the *Brill's New Pauly*: e.g., Halicarnassensis;
- `Chronology of witnesses (authors)` according to the TLG, the *Perseus Catalog* or the *Brill's New Pauly*: e.g., 5 B.C.;
- `Witnesses (works)` that preserve text reuses of FHG authors and works (the list is arranged in alphabetical order): e.g., *Historiae*;
- `Perseus Catalog Works CTS urns`: e.g., `urn:cts:greekLit:tlg0016.tlg001`;
- `Passages of works` that preserve text reuses of FHG authors and works with corresponding DFHG volumes, authors, works, passages and fragments: e.g., 4.36;[177]
- Data includes also references and links to `inscriptions`, `manuscripts`, and `editions` cited in the FHG as sources of fragments.

The DFHG *Witnesses Catalog* has been produced semi-automatically by combining DFHG data with new data and by structuring them in the following 42 fields:

`id, DFHG_id, Volume, Sub_volume, Author, Section, Work, Work_section, Book, Chapter, Paragraph, Sub_paragraph, Page, Type, Fragment_number, Fragment_letter, Fragment_note, Inscription, Inscription_date, Inscription_link, Manuscript, Manuscript_date, Manuscript_link, Edition, Witness_author, Witness_author_Perseus_Catalog, Witness_work, Witness_book_volume, Witness_passage, Witness_passage_link, Witness_work_Perseus_Catalog, Witness_date, Witness_date_in, Witness_date_out, Witness_date_note, Witness_genre, Witness_author_geographical_epithet, Witness_author_geographical_epithet_note, Witness_place, Pleiades_URI, Latitude, Longitude.`

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177 The list is arranged following the order of FHG authors and fragments. FHG authors and fragments are linked to the DFHG *URN Retriever* (see p. 172).

The DFHG *Witnesses Catalog* currently contains 10,339 entries belonging to the following 244 unique authors (witnesses):[178]

Achilles Tatius, Aelianus, Aelius Aristides, Aelius Donatus, Aelius Herodianus, Aelius Lampridius (*Historia Augusta*), Aelius Spartianus (*Historia Augusta*), Aelius Theon, Agathangelus, Agathemerus, Agathias Scholasticus, Alexander, Ambrosius Theodosius Macrobius, Ammianus Marcellinus, Ammonius, Anonymi Historici, Anonymi Paradoxographi, Anonymus, *Anthologia Palatina*, Antigonus, Antoninus Liberalis, Apollodorus, Apollonius, Apollonius Dyscolus, Apollonius Rhodius, *Appendix Proverbiorum*, Appianus, *Argumentum in Sophoclis Oedypum Tyrannum*, *Argumentum in Theocriti Idyllia VI*, *Aristeae epistula ad Philocratem*, Aristodemus, Aristoteles, Arnobius, Athenaeus, Athenagoras, Aulus Gellius, Aurelius Augustinus, Aurelius Victor, Bardesanes, Caius Iulius Hyginus, Caius Iulius Solinus, Caius Plinius Secundus, Calcidius, Cassius Dio, Censorinus, *Certamen Homeri et Hesiodi*, *Chronicon paschale*, Claudius Aelianus, Clemens Alexandrinus, Cleomedes, *Collectio verborum utilium e differentibus rhetoribus et sapientibus multis*, Constantinus VII Porphyrogenitus, Cornelius Nepos, Cosmas Indicopleustes, Cyrillus, Damascius, Demetrius, Diodorus Siculus, Diogenes Laertius, Diomedes, Dionysius Byzantius, Dionysius Halicarnassensis, Epictetus, *Epimerismi Homerici*, Epiphanius, Eratosthenes, Erotianus, *Etymologicum Genuinum*, *Etymologicum Gudianum*, *Etymologicum Magnum*, Eudocia Macrembolitissa, Eunapius, Eusebius, Eusebius Sophronius Hieronymus, Eustathius, Eustratius, Eutocius, Eutropius, Evagrius Scholasticus, *Excerpta Eusebiana*, *Excerpta Latina Barbari*, *Excerpta Salmasiana*, *Excerpta philosophica* (Περὶ Ἱππομάχου), Fabius Planciades Fulgentius, Faustus, Flavius Arrianus, Flavius Claudius Iulianus, Flavius Cresconius Corippus, Flavius Josephus, Flavius Magnus Aurelius Cassiodorus, Flavius Mallius Theodorus, Flavius Philostratus, Flavius Sosipater Charisius, Flavius Vopiscus (*Historia Augusta*), Gaius Suetonius Tranquillus, Galenus, Geminus, Geoponica, Georgius Choeroboscus, Georgius Codinus, Georgius Monachus, Georgius Syncellus, Germanicus Caesar, *Glossae rhetoricae*, Gregorius Magistratus, Guarinus Phavorinus, Harpocration, Heraclides Lembus, Herodianus, Herodotus, Hesychius, Hippolytus, Iamblichus, Interpretes Virgilii, Ioannes, Ioannes Laurentius Lydus, Ioannes Malalas, Ioannes Stobaeus, Ioannes Tzetzes, Iordanes, Isidorus Hispalensis, Iulius Capitolinus (*Historia Augusta*), Iulius Pollux, Iulius Valerius Alexander Polemius, Iunius Filagrius, Iustinus Martyr, Joannes Epiphaniensis, Lactantius, Lactantius Placidus, Lerubnas, Lesbonax, *Lexicon rhetoricum Cantabrigiense*, Lucianus, Lucius Annaeus Seneca, Lucius Caecilius Minutianus Apuleius, Marcellinus, Marcus Fabius Quintilianus, Marcus Iunianus Iustinus, Marcus Minucius Felix, Marcus Servius Honoratus, Marcus Terentius Varro, Marcus Tullius Cicero, Marcus Valerius Probus, Marcus Vitruvius Pollio, *Marmor Parium*, *Marmor Rosettanum*, Martianus Minneus Felix Capella, Maximus Confessor, Michael Apostolius, Michael Critobulus, Michael Syncellus, Moeris Atticista, Moses, Mythographi Vaticani, Natalis Comes, Nemesius, Origenes, Orosius, Oukhthanès d'Édesse, Parthenius, Pausanias, Photius, Phrynichus, Plato, Plutarchus,

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178 For a proper extraction and visualization of data, a record "No Witness Author" has been created in the field `Witness_author` for the entries concerning `inscriptions`, `manuscripts`, and `editions` and for those cases where Karl Müller doesn't provide authors with fragments:

Polyaenus, Polybius, Porphyrius, Postumius Rufus Festus Avienus, Priscianus, Priscus, Proclus, Procopius, *Proverbia Bodleiana*, Pseudo-Agathangelus, Pseudo-Apollodorus, Pseudo-Caesarius, Pseudo-Callisthenes, Pseudo-Clemens, Pseudo-Longinus, Pseudo-Plutarchus, Pseudo-Scymnus, Pseudo-Zonaras, Ptolemaeus Chennus, Publius Aelius Phlegon, Publius Rutilius Lupus, Quintus Curtius Rufus, Quintus Septimius Florens Tertullianus, *Scholia in Aelium Aristidem, Scholia in Aeschinem, Scholia in Aeschylum, Scholia in Apollonium Rhodium, Scholia in Aratum, Scholia in Aristophanem, Scholia in Clementem Alexandrinum, Scholia in Demosthenem, Scholia in Dionysium Periegetam, Scholia in Dionysium Thracem, Scholia in Euripidem, Scholia in Hermogenem, Scholia in Hesiodum, Scholia in Homerum, Scholia in Horatium, Scholia in Isocratem, Scholia in Iulium Caesarem Germanicum, Scholia in Lucianum, Scholia in Lycophronem, Scholia in Nicandrum, Scholia in Novum Testamentum, Scholia in Oribasium, Scholia in Pindarum, Scholia in Platonem, Scholia in Sophoclem, Scholia in Theocritum,* Sextus Empiricus, Sextus Iulius Africanus, Sextus Pompeius Festus, Simplicius, Socrates Scholasticus, Sotion, Stephanus Byzantius, Strabo, *Suda,* Synesius, Tatianus, Themistius, Theodoretus, Theodorus Metochites, Theophanes Confessor, Theophilus, Theophrastus, *Titi Livii Epitome,* Titus Livius, Trebellius Pollio (*Historia Augusta*), Valerius Maximus, *Veteres glossae verborum iuris, Vita Sophoclis, Vitae Aeschyli, Vitae Arati, Vitae Euripidis, Vitae Homeri,* Vulcacius Gallicanus (*Historia Augusta*), Zenobius, Zosimus.

The catalog also contains a total of 428 unique work titles (witnesses):[179]

Ab excessu divi Marci, Ab urbe condita libri, Acharnenses, Acta Apostolorum, Ad Ammaeum, Ad Atticum, Ad Autolycum, Ad Nicomedem regem, Ad Statii Thebaida, Ad Terentii Eunuchum, Ad Theodosii Canones, Ad Virgilii Aeneidem, Ad Virgilii Bucolica, Ad Virgilii Ecloga, Ad Virgilii Georgica (3), *Adversus Colotem, Adversus gentes, Adversus haereses, Adversus Iovinianum* (PL 23), *Adversus Leptinem, Adversus mathematicos, Aemilius Paullus, Aeneis, Aetia romana et graeca, Agesilaus, Agis, Aiax, Alcestis, Alcibiades, Alexander* (2), *Alexander Severus, Alexandra, Alexipharmaca, Amatorius, An seni respublica gerenda sit, Andromacha, Antehomerica, Anthologia Palatina, Anthologium, Antiatticista, Antiquitates Judaicae, Antiquitates Romanae, Antonius, Apologeticum, Apologia, Appendix proverbiorum, Aratus, Argonautica* (2), *Argumentum in Sophoclis Oedypum Tyrannum, Argumentum in Theocriti Idyllia VI, Aristeae epistula ad Philocratem, Aristides, Ars grammatica* (3), *Artaxerxes, Aurelianus, Aves, Avidius Cassius, Axiochus, Bibliotheca* (3), *Bibliotheca historica, Breviarium historiae romanae, Brutus* (2), *Caelestia, Caesar, Calvitii encomium, Camillus, Carmen de figuris, Carus et Carinus et Numerianus, Cataplus, Catasterismi, Certamen Homeri et Hesiodi, Cesti, Chiliades, Chronicon, Chronicon armenum, Chronicon breve, Chronicon paschale, Chronographia (2), Cimon, Claudi Caesaris Arati Phaenomena* (2), *Claudi Caesaris Arati Phaenomena (ad Arietem), Claudi Caesaris Arati Phaenomena (ad Taurum), Claudius, Cleomenes, Clodius Albinus, Cohortatio ad Graecos, Collectio paroemiarum, Collectio verborum utilium e differentibus rhetoribus et sapientibus multis, Collectiones medicae, Commentarii ad Homeri Iliadem, Commentarii ad Homeri Odysseam, Commentariorum in Danielem prophetam liber unus* (PL 25), *Commentariorum in Osee prophetam libri tres* (PL 25), *Commentarium in Dionysii periegetae or-*

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179   Numbers in parentheses indicate the number of homonymous titles belonging to different authors (e.g., the *Lexicon* of Hesychius, Photius, Pseudo-Zonaras and the *Suda*).

*bis descriptionem, Commentarium in Hermogenis librum περὶ ἰδεῶν, Commentarium in Plato-
nis Timaeum, Commentarius in dimensionem circuli, Comparatio Aemilii Paulli et Timoleontis,
Comparatio Pelopidae et Marcelli, Comparatio Solonis et Publicolae, Consolatio, Contra Apionem,
Contra Celsum, Contra Julianum imperatorem, De abstinentia, De adfinium vocabulorum differ-
entia, De administrando imperio, De aedificiis Constantinopolitanis, De Alexandri Magni fortuna
aut virtute, De anima, De animae procreatione in Timaeo, De architectura libri decem, De bellis,
De causis plantarum, De civitate Dei, De cohibenda ira, De conjunctionibus, De corona militis, De
defectu oraculorum, De die natali, De Dinarcho, De divinatione, De E apud Delphos, De elocutione,
De expeditione Alexandri, De facie in orbe lunae, De falsa legatione, De figuris, De fluviis, De for-
tuna Romanorum, De garrulitate, De generatione animalium, De Herodoti malignitate, De incredi-
bilibus, De Isaeo, De Iside et Osiride, De iusto, De legibus, De lingua latina, De longaevis, De Lysia,
De magistratibus populi romani, De mensibus, De mensuribus et ponderibus (arm.), De metris, De
mirabilibus, De musica, De natura animalium, De natura deorum, De natura hominis, De Nilo, De
nuptiis Philologiae et Mercurii, De officiis, De opificio dei , De oratore, De orthographia, De parasito,
De Periplo Scylacis Caryandensis, De placitis Hippocratis et Platonis, De principiis, De Pythiae orac-
ulis, De re publica, De re rustica, De rebus gestis Alexandri, De rebus Geticis, De sollertia animalium,
De spectaculis, De sublimitate, De thematibus, De Thucydide, De verborum significatione, De viris
illustribus* (PL 23), *De vita Pythagorica, Deipnosophistae, Demetrius, Demosthenes, Dialogi deo-
rum, Dialogi meretricii, Dion, Dissertationes ab Arriano digestae, Divinae institutiones, Divus Au-
gustus, Ecclesiazusae, Ecloga chronographica, Eclogae, Electra, Elementa astronomiae, Encomium
in sacrosanctum Christi martyrem beatum Dionysium Areopagitam, Epimerismi Homerici, Epis-
tula ad Mechemet II, Epistula ad Pompeium Geminum, Epitome collectionum Lucilli Tarrhaei et
Didymi, Epitome historiarum Philippicarum, Equites, Ethnica, Ethnica (epitome), Etymologicum
Genuinum, Etymologicum Gudianum, Etymologicum Magnum, Eumenes, Excerpta de insidiis, Ex-
cerpta de legationibus, Excerpta de legationibus gentium ad Romanos, Excerpta de legationibus
Romanorum ad gentes, Excerpta de sententiis, Excerpta de strategematibus, Excerpta de virtutibus
et vitiis, Excerpta Eusebiana, Excerpta Latina Barbari, Excerpta philosophica (Περὶ Ἱππομάχου),
Excerpta politiarum, Excerpta Salmasiana, Exegesis in Homeri Iliadem, Expositio sermonum an-
tiquorum, Fabius Maximus, Facta et dicta memorabilia, Gallienus, Geographiae informatio, Ge-
ographica, Geoponica, Glossae rhetoricae, Gordianus, Graecarum affectionum curatio, Graeciae
descriptio, Hadrianus, Haereticarum fabularum compendio, Hecuba, Hipparchus, Hippias maior,
Hippias minor, Hippolytus, Histoire de la séparation religieuse des Arméniens et des Géorgiens,
Historia Alexandri Magni (armen.), Historia animalium, Historia arcana, Historia Ecclesiastica*
(3), *Historia naturalis, Historia nova, Historia plantarum, Historia Romana, Historiae* (6), *Histo-
riae adversum paganos, Historiae Alexandri Magni Macedonis, Historiae Armeniacae* (3), *Histo-
riae mirabiles, Historiae provinciae Taron* (2), *Historiarum mirabilium collectio, Homiliae, Idyllia,
Ilias, In Aristotelis categorias commentarium, In Aristotelis Ethica Nicomachea, In Aristotelis Eth-
ica Nicomachea ii–v commentaria, In Aristotelis libros de anima paraphrasis, In Aristotelis meta-
physica commentaria, In Platonis Timaeum commentaria, In prooemio ad S. Dionysii Areopagitae
Opera, In S. Dionysii Areopagitae Opera, In Timarchum, Indica, Institutio de arte grammatica,*

Institutio oratoria, Isagoga excerpta, Isthmia, Laches, Laudes Iustini, Legatio sive supplicatio pro Christianis, Leges, Lexicon (4), Lexicon Atticum, Lexicon Graecum, Lexicon Homericum, Lexicon in decem oratores, Lexicon rhetoricum Cantabrigiense, Lexiphanes, Lucullus, Lycurgus, Lysander, Lysistrata, Macrobii, Marcellus, Marius, Marmor Parium, Marmor Rosettanum, Maxime cum principibus philosopho esse disserendum, Maximinus iunior, Maximus et Balbinus, Medea, Metamorphosarum collectio, Meteorologica, Miscellanea philosophica et historica, Misopogon, Mithridatica, Mulierum virtutes, Mythologiae (2), Narrationes amatoriae, Naturales quaestiones, Nemea, Nicias, Noctes Atticae, Non posse suaviter vivi secundum Epicurum, Nova historia, Nubes, Numa, Octavius (PL 3), Odyssea, Oedipus Coloneus, Oedipus Tyrannus, Olympia, Olynthiaca 2, Onomasticon, Onomatologos, Opera et dies, Opera et dies (Proclus), Ora maritima, Oratio ad Graecos, Orbis descriptio, Orestes, Origines, Origo gentis romanae, Parallela minora, Pax, Pelopidas, Per Bosporum navigatio, Periplus Ponti Euxini, Persae, Pescennius Niger, Phaedo, Phaedrus, Phaenomena, Philippus, Philopoemen, Phocion, Phoenissae, Placita philosophorum, Plutus, Poeticon astronomicon, Politica, Polyhistoria, Pompeius, Poplicola, Posthomerica, Praeparatio evangelica, Progymnasmata, Protrepticus (2), Proverbia Bodleiana, Pyrrhonia hypotyposes, Pyrrhus, Pythia, Quadrigae tyrannorum, Quaestiones convivales, Quaestiones et responsiones, Quaestionum Homericarum ad Iliadem pertinentium reliquiae, Quomodo historia conscribenda sit, Ranae, Recognitiones, Refutatio omnium haeresium, Regum et imperatorum apophthegmata, Res gestae, Rhesus, Rhetorica, Romulus, Satires, Saturnalia, Scholia et glossemata in Chiliades, Septem sapientium convivium, Sertorius, Severus, Solon, Strategemata, Stromata, Sulla, Symposium (2), Tactica (2), Themistocles, Theogonia, Theologoumena arithmeticae, Theriaca, Theseus, Thesmophoriazusae, Timaeus, Timaeus (Proclus), Timoleon, Timon, Titi Livii Epitome, Topographia Christiana, Trachiniae, Tractatus de mulieribus, Troades, Tusculanae disputationes, Tyranni triginta, Varia historia, Variae, Verus, Vespae, Veteres glossae verborum iuris, Vita, Vita Alcibiadis, Vita Apollonii, Vita Chabriae, Vita Cononis, Vita Iphicratis, Vita Pythagorae, Vita Sancti Gregorii Illuminatoris (armen.), Vita Sancti Gregorii Illuminatoris (graec.), Vita Sophoclis, Vita Thucydidis, Vitae Aeschyli, Vitae Arati, Vitae decem oratorum, Vitae Euripidis, Vitae Homeri, Vitae philosophorum, Vitae sophistarum (2), Vocum Hippocraticarum collectio, Αἰγύπτιος, Ἀττικῶν ὀνομάτων συναγωγή, Εἰς τὰ ἁρμονικὰ Πτολεμαίου ὑπόμνημα, Ἰωνιά (Violarium), Παναθηναϊκός (2), Παροιμίαι αἷς Ἀλεξανδρεῖς ἐχρῶντο, Περὶ μονήρους λέξεως, Περὶ στάσεων, Περὶ Στυγός, Πρὸς Πλάτωνα ὑπὲρ τῶν τεττάρων, Σοφιστής, Τῶν σποράδην περὶ ποταμῶν καὶ κρηνῶν καὶ λιμνῶν παραδοξολογουμένων, Ὑπὲρ τῶν τεττάρωνων.

The two lists share the following 29 work titles because they are classified both as `witness_author` and as `witness_work`:

Anthologia Palatina, Appendix proverbiorum, Argumentum in Sophoclis Oedypum Tyrannum, Argumentum in Theocriti Idyllia VI, Aristeae epistula ad Philocratem, Certamen Homeri et Hesiodi, Chronicon paschale, Collectio verborum utilium e differentibus rhetoribus et sapientibus multis, Epimerismi Homerici, Etymologicum Genuinum, Etymologicum Gudianum, Etymologicum Magnum, Excerpta Eusebiana, Excerpta Latina Barbari, Excerpta philosophica (Περὶ Ἱππομάχου), Excerpta Salmasiana, Geoponica, Glossae rhetoricae, Lexicon rhetoricum Cantabrigiense, Marmor

Parium, *Marmor Rosettanum*, *Proverbia Bodleiana*, *Titi Livii Epitome*, *Veteres glossae verborum iuris*, *Vita Sophoclis*, *Vitae Aeschyli*, *Vitae Arati*, *Vitae Euripidis*, *Vitae Homeri*.

The reason for the overlapping depends on the nature of these sources and also on the model of the classification adopted by the TLG *Canon*, where works whose author's names are unknown are listed under the field `Author Name`.[180] For example, the *Etymologicum Magnum* in the TLG is an `Author` with a four-digit number (`tlg4099`), but also a `Work title` with a three-digit number (`tlg4099.0001`).[181] Sixteen works out of the twenty-nine listed above have a four-digit number in the TLG *Canon.* As a matter of fact and except for the *Epimerismi Homerici* and the *Glossae rhetoricae*, in the online version of the TLG they can be accessed with a search both in the field `Author` and in the field `Work Title`. The other thirteen works don't have a correspondence in the TLG, but in the DFHG *Witnesses Catalog* they have been treated in the same way as the other sixteen. The following list is the same that has been printed above with the addition of available TLG numbers:[182]

Anthologia Palatina (`tlg7000`), *Appendix proverbiorum* (`tlg9007`), *Argumentum in Sophoclis Oedypum Tyrannum*, *Argumentum in Theocriti Idyllia VI*, *Aristeae epistula ad Philocratem* (`tlg1183`), *Certamen Homeri et Hesiodi* (`tlg1252`), *Chronicon paschale* (`tlg2371`), *Collectio verborum utilium e differentibus rhetoribus et sapientibus multis*, *Epimerismi Homerici* (`tlg5004.001`),[183] *Etymologicum Genuinum* (`tlg4097`), *Etymologicum Gudianum* (`tlg4098`), *Etymologicum Magnum* (`tlg4099`), *Excerpta Eusebiana*, *Excerpta Latina Barbari*, *Excerpta philosophica* (Περὶ Ἱππομά-χου), *Excerpta Salmasiana*, *Geoponica* (`tlg4080`), *Glossae rhetoricae* (`tlg4289.004`),[184] *Lexicon rhetoricum Cantabrigiense* (`tlg4301`), *Marmor Parium*, *Marmor Rosettanum*, *Proverbia Bodleiana*, *Titi Livii Epitome*, *Veteres glossae verborum iuris*, *Vita Sophoclis* (`tlg4318`), *Vitae Aeschyli* (`tlg4141`), *Vitae Arati* (`tlg4161`), *Vitae Euripidis*, *Vitae Homeri* (`tlg1805`).

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180 Berkowitz/Squitier (1990) xv: "Entries in the *Canon* are arranged in alphabetical order according to names of authors and, where authors' names are not known, commonly recognized names of extant treatises, poems, or literary corpora."

181 The work title corresponds to the text of the *Etymologicum Magnum* published in the TLG which is extracted from the edition of Thomas Gaisford (1848, repr. 1967). On the classification of authors and works in the TLG, see pp. 18 ff.

182 The DFHG *Witnesses Catalog* doesn't include TLG numbers, but provides CITE and CTS URNs of the *Perseus Catalog* that embed TLG numbers. Given that there are TLG authors and works that are still missing in the *Perseus Catalog*, it is possible that authors and works in the DFHG *Witnesses Catalog* are not provided with corresponding *Perseus* URNs and therefore TLG numbers. For example, the *Appendix proverbiorum* (`tlg9007`) is not in the *Perseus Catalog*.

183 In the TLG *Canon* the *Epimerismi Homerici* (`tlg5004.001`) are cataloged under the *Epimerismi* (`tlg5004`).

184 In the TLG the *Glossae rhetoricae* (`tlg4289.004`) are cataloged under the *Lexica Segueriana* (`tlg4289`).

Another case is the Byzantine lexicon *Suda*, which is in the list of authors and not in the list of works, because *Suda* is labelled as `witness_author` with *Lexicon* as its corresponding `witness_work`. This classification is the same of the TLG, where *Suda* is `tlg9010` and under it are grouped the *Lexicon* (`tlg9010.001`) and the *Onomasticon tacticon* (`tlg9101.002`). A difference with the TLG is represented by *scholia*, because they are classified only as `witness_author`. The reason is due to the fact that in the DFHG catalog of witnesses *scholia* are always accompanied by work titles (`witness_work`), as in the example of the *Scholia in Aristophanem* that group eleven comedy titles (*Acharnenses*, *Aves*, *Ecclesiazusae*, *Equites*, *Lysistrata*, *Nubes*, *Pax*, *Plutus*, *Ranae*, *Thesmophoriazusae*, *Vespae*). These classifications are of course questionable and sources could be treated in a different way. Nevertheless, the goal of this work is not to provide definitive data, but to show and discuss the complexity of philological citations and how this complexity should be addressed in a digital environment, expecially because results affect in a significant way visualizations and statistics.

In order to produce the catalog, data was initially exported from the field `witness` of the DFHG database (see p. 151). This field preserves the citations provided by Karl Müller, which are compact, sometimes inconsistent, and full of abbreviations.[185] After that, semi-automatic reworking was performed in order to expand the abbreviations and generate uniform citations, whose elements have been split into different fields in the database of witnesses.

The goal of the DFHG *Witnesses Catalog* is not to preserve the original form of the citations of the FHG, because they are already preserved in the DFHG database, but to create a new tool that collects the rich set of philological citations of the FHG, connects them to external resources, and expands them in order to contribute to the creation of a unified digital catalog of witnesses of fragmentary literature.[186]

Two examples are "Herodot. IV, 36" (witness of fragment 1 of Hecataeus: FHG I 1) and "Dionys. Halic. Archaeol. I, 28" (witness of fragment 1 of Hellanicus: FHG I 45). Paragraph 28 of book 1 of the work of Dionysius Halicarnassensis preserves also fragment 1 of Xanthus (FHG I 36), but in this case the citation is expressed as "Dionys. Halicarn. Antiq. I, 28 73 Reisk." The citation of Herodotus has been expanded, the reference to the passage has been exported to two sep-

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185 This consideration is not a criticism against the work of Karl Müller, because the digitization of the FHG reveals how he was able to be precise and in general very consistent when working in an age without computers and on an enterprise that lasted about thirty years to publish five printed volumes. This reflection is about the unavoidable inconsistency and imperfections of bibliographic references in big editorial projects: cf. Bonnechère (1999), vol. I, vii–x.

186 The production of the DFHG *Witnesses Catalog* lasted ca. four months of almost full time work. On the standardization of Jacoby's citations, see Bonnechère (1999), vol. I, ix.

Figure 4.23. DFHG *Witnesses Catalog*: Herodotus

arate fields, the book number has been converted from a Roman to an Arabic numeral, and the title of his work has been added and inserted in another field:

Herodotus|*Historiae*|4|36

By searching "Herodotus" as a `witness_author` in the DFHG *Witnesses Catalog*, it is possible to obtain a web page with this citation together with other passages of the *Historiae* that preserve Greek historical fragments (fig. 4.23):

`http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=witness_au`
`thor|Herodotus&onoffswitch=on`

The two citations of the same paragraph of Dionysius Halicarnassensis have been expanded and made uniform in the following way:

Dionysius Halicarnassensis|*Antiquitates Romanae*|1|28

Like in the case of Herodotus, the passage of Dionysius is accessible in a web page of the DFHG *Witnesses Catalog* together with other passages of other Dionysius' works that preserve historical fragments (fig. 4.24):

`http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=witness_au`
`thor|Dionysius+Halicarnassensis&onoffswitch=on`

Dionysius Halicarnassensis is not only a witness of other authors, but also an FHG author because Karl Müller publishes fragments of the *Antiquitates Romanae* preserved in a manuscript of the El Escorial collection (FHG 2 xxxi–xlii):

Where witness_author="Dionysius Halicarnassensis"

DIONYSIUS HALICARNASSENSIS
urn:cite:perseus:author.511
Historicus, Rhetor - Halicarnassensis (Halicarnassus)
 1 B.C.

Ad Ammaeum

PASSAGE	DFHG VOLUME	AUTHOR	WORK			FR.	TEXT REUSE
9	Volumen primum	PHILOCHORUS	ATTHIS			132	╫
11	Volumen primum	PHILOCHORUS	ATTHIS			135	╫

Antiquitates Romanae
urn:cts:greekLit:tlg0081.tlg001

PASSAGE	DFHG VOLUME	AUTHOR	WORK			FR.	TEXT REUSE
1.28	Volumen primum	XANTHUS	ΛΥΔΙΑΚΑ			1	╫
1.28	Volumen primum	HELLANICUS	ΦΟΡΩΝΙΣ			1	╫
1.22	Volumen primum	HELLANICUS	ΙΕΡΕΙΑΙ ΤΗΣ ΗΡΑΣ			53	╫
1.35	Volumen primum	HELLANICUS	ΕΘΝΩΝ ΟΝΟΜΑΣΙΑΙ			97	╫
1.46	Volumen primum	HELLANICUS	ΤΡΩΙΚΑ			127	╫
1.13	Volumen primum	PHERECYDES	ΙΣΤΟΡΙΑΙ			85	╫
1.22	Volumen primum	ANTIOCHUS	ΠΕΡΙ ΣΙΚΕΛΙΑΣ			1	╫
1.12	Volumen primum	ANTIOCHUS	ΠΕΡΙ ΙΤΑΛΙΑΣ			3	╫
1.35	Volumen primum	ANTIOCHUS	ΠΕΡΙ ΙΤΑΛΙΑΣ			4	╫
1.73	Volumen primum	ANTIOCHUS	ΠΕΡΙ ΙΤΑΛΙΑΣ			7	╫
1.22	Volumen primum	PHILISTUS	ΙΣΤΟΡΙΑΙ			2	╫
1.67	Volumen primum	TIMAEUS	ΙΣΤΟΡΙΑΙ			20	╫
1.73	Volumen primum	TIMAEUS	ΙΣΤΟΡΙΑΙ			21	╫
1.61	Volumen primum	PHANODEMUS	FRAGMENTA INCERTAE SEDIS			8	╫

**Figure 4.24.** DFHG *Witnesses Catalog*: Dionysius Halicarnassensis

This is the reason why Dionysius Halicarnassensis can be searched in the DFHG *Witnesses Catalog* both as a `witness_author` and as an `author`.

The citations of Herodotus and Dionysius Halicarnassensis are straightforward examples, but there are many other cases in the FHG that present complexities for generating complete, stable, and machine readable references. Examples are the form "Idem:" as witness of fragment 17 of Theopompus (FHG I 280) and the form "Steph. Byz.:" as witness of fragment 3 of Hecataeus (FHG I 1). In the first case the actual reference was manually obtained by checking the previous reference in the collection (Theop. fr. 16), which reveals that the witness is Stephanus Byzantius.[187] The precise reference to the work of the lexicographer was completed by analyzing the text of fragment 17 that includes the word of the entry (Κάλπαι):[188]

Stephanus Byzantius|*Ethnica*|Κάλπαι

The second example is an evidence of many different possible ways for abbreviating an author. In the FHG, Stephanus Byzantius is abbreviated as "S. B.", "St. B.", "Steph. B.", "Steph. Byz.", "Steph.", "Stephan." and "Stephanus". Automatic expansions of these abbrevations are of course not a complex task, by their different forms and those of other abbreviated authors and works have to be individuated and collected in advance in order to produce consistent expanded references.

Another complex example is the reference to the witnesses of fragment 19 of Xanthus (FHG I 39–42). Under the number 19, Karl Müller collects different source texts. Among them, there is a reference to Hesychius and to the *Suda*: "Eadem Gygi tribuuntur ap. Hesychium et Suidam, qui eodem Xantho auctore ex eodem libro haec in medium proferunt:". This reference is followed by the quotation of a Greek text: "Ὅτι πρῶτος Γύγης ὁ Λυδῶν βασιλεὺς γυναῖκας εὐνούχισεν, ὅπως αὐταῖς χρῷτο ἀεὶ νεαζούσαις." This text is an excerpt from an entry of the *Suda* ([Ξ 9] s.v. Ξάνθος). We don't have the corresponding text from Hesychius (of Miletus), but the reference by Müller is due to the discussion about the hy-

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187 The same form "Idem" is used also for fragments 17 and 18 of Theopompus. According to the tradition of philological citations, the FHG is full of cases where the adjective *idem* is used, sometimes in the abbreviated form "Id.". There are also cases in the FHG where the form *idem* can be only partially inferred from the previous reference in the collection. The conversion of these references into independent and complete citations has been done manually.

188 When structuring the content of the FHG for producing the database, the punctuation used by Müller at the end of his citations was used to separate the witness from the text of the fragment. In the case of lexicographic works, Müller generally adds a colon after the name of the author (e.g., "Hesych.:", "Suidas:", etc.). After the colon, he prints the text of the lexicographic entry that preserves the fragment, which also generally includes the word that in modern references is part of a complete lexicographic citation (e.g., "*Suda* [Π 1168] s.v. Περιθοῖδαι:"). As a consequence, the lack of the reference to the actual entry in the citation of the witness has required a substantial and time consuming manual work to infer it from the text of the corresponding fragment.

pothetical reconstruction of the text of Hesychius and about how much material the author of the *Suda* derived from him. This is the reason why in this case the DFHG *Witnesses Catalog* collects both references to Hesychius Milesius and to the *Suda*.[189] Finally, another interesting example that shows the complexities for connecting traditional philological citations with digital editions of Classical sources is represented by Strabo. In the FHG Karl Müller uses the citation system adopted by Isaac Casaubon (1620) for citing the geographer, which means referring to the book number of the *Geography* of Strabo and to the page and the section of the printed edition of Casaubon. For example, Strabo XII 550, B is the citation of the passage that preserves Hellanicus fr. 172 (FHG I 69). Digital editions of Strabo adopt the citation system devised by August Meineke (1852–1853), who arranges the *Geography* in books, chapters, and paragraphs. Consequently, the above mentioned citation in the edition of Meineke corresponds to Strabo XII, 3, 21.[190]

The reason for this choice in digital editions is due to the fact that the system of Meineke separates in a precise way chapters and paragraphs, while the system of Casaubon is not precise and this is a problem in a computational environment.[191] The *Perseus Digital Library* and the TLG provide the digital version of the edition of Strabo by Meineke, which means that they provide the arrangement of the contents of the *Geography* by books, chapters, and sections. The *Perseus* CTS URN of the passage of Strabo (ed. Meineke) that preserves Hellanicus fr. 172 is `urn:cts:greekLit:tlg0099.tlg001.perseus-grc1:12.3.21`. In the case of Strabo, the DFHG *Witnesses Catalog* keeps the citations of Karl Müller that are based on the edition of Casaubon. For connecting these passages to external digital editions of Strabo, the citations of the FHG should be converted into the corresponding citations of Meineke and, through their corresponding CTS URNs, linked to the digital text of the *Geography*.[192]

Figures 4.23 and 4.24 show that the original citations provided in the FHG have been not only expanded and made uniform, but also enriched with meta-

189 As a matter of fact, see FHG IV 171, Ξ 47, where Karl Müller publishes the text of Hesychius Milesius reconstructed from the entry of the *Suda*. On the work of Hesychius and his treatment in the FHG, see p. 157. For a recent discussion about the relationship between Hesychius Milesius and the *Suda* in relation to Xanthus, see BNJ 765 T1a.

190 Meineke preserves in his edition the corresponding citation system of Casaubon by printing it on the external margins of the pages and by adding a "C." before each Casaubon page number.

191 This is a well known issue in Classical philology and concerns the citation of other authors. For a more extended discussion of this topic in relation to the *Deipnosophists* of Athenaeus, see section 5.4.1.

192 This kind of work has been performed for the *Deipnosphists* of Athenaeus in order to generate stable computational identifiers of the work of the Nucratites: see chapter 5.

data.[193] Every author and every work is respectively provided with a CITE URN and a CTS URN of the *Perseus Catalog*.[194] Authors are also provided with literary and geographical epithets, and with a chronology.[195] Geographical epithets are accompanied by place names with links to *Pleiades* Canonical URIs, whose geographic coordinates have been used to generate the DFHG *Witnesses Map* (see section 4.4.2.1). Chronological data has been used to produce the DFHG *Witnesses Timeline* (see section 4.4.2.3). The *Perseus Catalog* currently provides the following 131 CITE URNs that correspond to authors who are witnesses of fragments in the DFHG *Witnesses Catalog*:[196]

urn:cite:perseus:author.10	urn:cite:perseus:author.511
urn:cite:perseus:author.19	urn:cite:perseus:author.529
urn:cite:perseus:author.38	urn:cite:perseus:author.560
urn:cite:perseus:author.63	urn:cite:perseus:author.568
urn:cite:perseus:author.73	urn:cite:perseus:author.573
urn:cite:perseus:author.109	urn:cite:perseus:author.582
urn:cite:perseus:author.147	urn:cite:perseus:author.593
urn:cite:perseus:author.151	urn:cite:perseus:author.603
urn:cite:perseus:author.152	urn:cite:perseus:author.604
urn:cite:perseus:author.157	urn:cite:perseus:author.607
urn:cite:perseus:author.192	urn:cite:perseus:author.609
urn:cite:perseus:author.194	urn:cite:perseus:author.611
urn:cite:perseus:author.204	urn:cite:perseus:author.629
urn:cite:perseus:author.206	urn:cite:perseus:author.642
urn:cite:perseus:author.228	urn:cite:perseus:author.649
urn:cite:perseus:author.236	urn:cite:perseus:author.659
urn:cite:perseus:author.248	urn:cite:perseus:author.661
urn:cite:perseus:author.300	urn:cite:perseus:author.665
urn:cite:perseus:author.323	urn:cite:perseus:author.685
urn:cite:perseus:author.328	urn:cite:perseus:author.728
urn:cite:perseus:author.341	urn:cite:perseus:author.730
urn:cite:perseus:author.361	urn:cite:perseus:author.755
urn:cite:perseus:author.364	urn:cite:perseus:author.758
urn:cite:perseus:author.382	urn:cite:perseus:author.771
urn:cite:perseus:author.413	urn:cite:perseus:author.785
urn:cite:perseus:author.428	urn:cite:perseus:author.792
urn:cite:perseus:author.435	urn:cite:perseus:author.793
urn:cite:perseus:author.488	urn:cite:perseus:author.794
urn:cite:perseus:author.494	urn:cite:perseus:author.799
urn:cite:perseus:author.510	

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193 Ancient Greek author names and work titles have been expanded and made uniform according to the TLG *Canon*. Other authors have been treated following the *Perseus Catalog* and the *Brill's New Pauly*.

194 For a description of these URNs, see Babeu (2019).

195 As far as ancient Greek authors are concerned, epithets and chronological data have been taken from the TLG *Canon*. For other authors metadata is generally taken from the *Perseus Catalog* and the *Brill's New Pauly*.

196 The last five authors in the list are not provided with CITE URNs, but with CTS URNs in the *Perseus Catalog*: *Anonymus* (*Periplus Ponti Euxini*), *Marcus Valerius Probus*, *Anonymi Historici*, *Scholia in Aeschylum*, *Scholia in Dionysium Periegetam*.

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urn:cite:perseus:author.807          urn:cite:perseus:author.1319
urn:cite:perseus:author.808          urn:cite:perseus:author.1325
urn:cite:perseus:author.810          urn:cite:perseus:author.1332
urn:cite:perseus:author.840          urn:cite:perseus:author.1333
urn:cite:perseus:author.844          urn:cite:perseus:author.1340
urn:cite:perseus:author.848          urn:cite:perseus:author.1365
urn:cite:perseus:author.861          urn:cite:perseus:author.1372
urn:cite:perseus:author.872          urn:cite:perseus:author.1394
urn:cite:perseus:author.889          urn:cite:perseus:author.1424
urn:cite:perseus:author.898          urn:cite:perseus:author.1448
urn:cite:perseus:author.939          urn:cite:perseus:author.1455
urn:cite:perseus:author.944          urn:cite:perseus:author.1469
urn:cite:perseus:author.966          urn:cite:perseus:author.1476
urn:cite:perseus:author.968          urn:cite:perseus:author.1481
urn:cite:perseus:author.1044         urn:cite:perseus:author.1482
urn:cite:perseus:author.1053         urn:cite:perseus:author.1503
urn:cite:perseus:author.1054         urn:cite:perseus:author.1512
urn:cite:perseus:author.1108         urn:cite:perseus:author.1524
urn:cite:perseus:author.1120         urn:cite:perseus:author.1574
urn:cite:perseus:author.1137         urn:cite:perseus:author.1652
urn:cite:perseus:author.1141         urn:cite:perseus:author.1685
urn:cite:perseus:author.1144         urn:cite:perseus:author.1697
urn:cite:perseus:author.1150         urn:cite:perseus:author.1704
urn:cite:perseus:author.1152         urn:cite:perseus:author.1722
urn:cite:perseus:author.1154         urn:cite:perseus:author.1763
urn:cite:perseus:author.1170         urn:cite:perseus:author.1843
urn:cite:perseus:author.1179         urn:cite:perseus:author.1943
urn:cite:perseus:author.1182         urn:cite:perseus:author.1949
urn:cite:perseus:author.1184         urn:cite:perseus:author.1956
urn:cite:perseus:author.1193         urn:cite:perseus:author.1963
urn:cite:perseus:author.1209         urn:cite:perseus:author.1975
urn:cite:perseus:author.1232         urn:cts:greekLit:tlg0075
urn:cite:perseus:author.1270         urn:cts:latinLit:phi0996
urn:cite:perseus:author.1279         urn:cts:greekLit:tlg1139
urn:cite:perseus:author.1285         urn:cts:greekLit:tlg5010
urn:cite:perseus:author.1302         urn:cts:greekLit:tlg5019
```

The *Perseus Catalog* also provides the following 235 CTS URNs that correspond to works of witnesses of fragments in the DFHG *Witnesses Catalog*:

```
urn:cts:greekLit:tlg0001.tlg001      urn:cts:greekLit:tlg0007.tlg010
urn:cts:greekLit:tlg0004.tlg001      urn:cts:greekLit:tlg0007.tlg011
urn:cts:greekLit:tlg0007.tlg001      urn:cts:greekLit:tlg0007.tlg013
urn:cts:greekLit:tlg0007.tlg002      urn:cts:greekLit:tlg0007.tlg015
urn:cts:greekLit:tlg0007.tlg004      urn:cts:greekLit:tlg0007.tlg018
urn:cts:greekLit:tlg0007.tlg005      urn:cts:greekLit:tlg0007.tlg019
urn:cts:greekLit:tlg0007.tlg007      urn:cts:greekLit:tlg0007.tlg020
urn:cts:greekLit:tlg0007.tlg008      urn:cts:greekLit:tlg0007.tlg021
urn:cts:greekLit:tlg0007.tlg009      urn:cts:greekLit:tlg0007.tlg022
```

urn:cts:greekLit:tlg0007.tlg023
urn:cts:greekLit:tlg0007.tlg024
urn:cts:greekLit:tlg0007.tlg027
urn:cts:greekLit:tlg0007.tlg030
urn:cts:greekLit:tlg0007.tlg031
urn:cts:greekLit:tlg0007.tlg032
urn:cts:greekLit:tlg0007.tlg033
urn:cts:greekLit:tlg0007.tlg035
urn:cts:greekLit:tlg0007.tlg036
urn:cts:greekLit:tlg0007.tlg038
urn:cts:greekLit:tlg0007.tlg041
urn:cts:greekLit:tlg0007.tlg042
urn:cts:greekLit:tlg0007.tlg045
urn:cts:greekLit:tlg0007.tlg047
urn:cts:greekLit:tlg0007.tlg048
urn:cts:greekLit:tlg0007.tlg049
urn:cts:greekLit:tlg0007.tlg051a
urn:cts:greekLit:tlg0007.tlg051b
urn:cts:greekLit:tlg0007.tlg057
urn:cts:greekLit:tlg0007.tlg058
urn:cts:greekLit:tlg0007.tlg060
urn:cts:greekLit:tlg0007.tlg061
urn:cts:greekLit:tlg0007.tlg063
urn:cts:greekLit:tlg0007.tlg064
urn:cts:greekLit:tlg0007.tlg079
urn:cts:greekLit:tlg0007.tlg081
urn:cts:greekLit:tlg0007.tlg083
urn:cts:greekLit:tlg0007.tlg084
urn:cts:greekLit:tlg0007.tlg085
urn:cts:greekLit:tlg0007.tlg086
urn:cts:greekLit:tlg0007.tlg087
urn:cts:greekLit:tlg0007.tlg089
urn:cts:greekLit:tlg0007.tlg090
urn:cts:greekLit:tlg0007.tlg091
urn:cts:greekLit:tlg0007.tlg092
urn:cts:greekLit:tlg0007.tlg095
urn:cts:greekLit:tlg0007.tlg101
urn:cts:greekLit:tlg0007.tlg112
urn:cts:greekLit:tlg0007.tlg113
urn:cts:greekLit:tlg0007.tlg115
urn:cts:greekLit:tlg0007.tlg117
urn:cts:greekLit:tlg0007.tlg121
urn:cts:greekLit:tlg0007.tlg123
urn:cts:greekLit:tlg0007.tlg126
urn:cts:greekLit:tlg0007.tlg129
urn:cts:greekLit:tlg0007.tlg134
urn:cts:greekLit:tlg0007.tlg139
urn:cts:greekLit:tlg0007.tlg140
urn:cts:greekLit:tlg0008.tlg001
urn:cts:greekLit:tlg0016.tlg001
urn:cts:greekLit:tlg0059.tlg011

urn:cts:greekLit:tlg0060.tlg001
urn:cts:greekLit:tlg0062.tlg011
urn:cts:greekLit:tlg0062.tlg030
urn:cts:greekLit:tlg0062.tlg053
urn:cts:greekLit:tlg0068.tlg001
urn:cts:greekLit:tlg0074.tlg001
urn:cts:greekLit:tlg0074.tlg002
urn:cts:greekLit:tlg0075.tlg001
urn:cts:greekLit:tlg0081.tlg001
urn:cts:greekLit:tlg0081.tlg003
urn:cts:greekLit:tlg0081.tlg005
urn:cts:greekLit:tlg0081.tlg009
urn:cts:greekLit:tlg0081.tlg010
urn:cts:greekLit:tlg0081.tlg015
urn:cts:greekLit:tlg0083.tlg003
urn:cts:greekLit:tlg0086.tlg012
urn:cts:greekLit:tlg0086.tlg014
urn:cts:greekLit:tlg0086.tlg026
urn:cts:greekLit:tlg0086.tlg035
urn:cts:greekLit:tlg0090.tlg001
urn:cts:greekLit:tlg0093.tlg001
urn:cts:greekLit:tlg0093.tlg002
urn:cts:greekLit:tlg0094.tlg001
urn:cts:greekLit:tlg0094.tlg002
urn:cts:greekLit:tlg0094.tlg003
urn:cts:greekLit:tlg0099.tlg001
urn:cts:greekLit:tlg0284.tlg013
urn:cts:greekLit:tlg0284.tlg046
urn:cts:greekLit:tlg0284.tlg048
urn:cts:greekLit:tlg0385.tlg001
urn:cts:greekLit:tlg0525.tlg001
urn:cts:greekLit:tlg0526.tlg001
urn:cts:greekLit:tlg0526.tlg003
urn:cts:greekLit:tlg0542.tlg001
urn:cts:greekLit:tlg0543.tlg001
urn:cts:greekLit:tlg0544.tlg001
urn:cts:greekLit:tlg0544.tlg002
urn:cts:greekLit:tlg0545.tlg001
urn:cts:greekLit:tlg0545.tlg002
urn:cts:greekLit:tlg0548.tlg001
urn:cts:greekLit:tlg0551.tlg014
urn:cts:greekLit:tlg0555.tlg001
urn:cts:greekLit:tlg0557.tlg001
urn:cts:greekLit:tlg0560.tlg001
urn:cts:greekLit:tlg0585.tlg004
urn:cts:greekLit:tlg0585.tlg005
urn:cts:greekLit:tlg0616.tlg001
urn:cts:greekLit:tlg0638.tlg003
urn:cts:greekLit:tlg0651.tlg001
urn:cts:greekLit:tlg0655.tlg001
urn:cts:greekLit:tlg0708.tlg001

urn:cts:greekLit:tlg0716.tlg001
urn:cts:greekLit:tlg0732.tlg004
urn:cts:greekLit:tlg0743.tlg001
urn:cts:greekLit:tlg1168.tlg001
urn:cts:greekLit:tlg1252.tlg002
urn:cts:greekLit:tlg1383.tlg001
urn:cts:greekLit:tlg1389.tlg001
urn:cts:greekLit:tlg1407.tlg002
urn:cts:greekLit:tlg1515.tlg001
urn:cts:greekLit:tlg1569.tlg001
urn:cts:greekLit:tlg2001.tlg023
urn:cts:greekLit:tlg2001.tlg040
urn:cts:greekLit:tlg2003.tlg012
urn:cts:greekLit:tlg2018.tlg001
urn:cts:greekLit:tlg2018.tlg002
urn:cts:greekLit:tlg2023.tlg001
urn:cts:greekLit:tlg2023.tlg005
urn:cts:greekLit:tlg2034.tlg002
urn:cts:greekLit:tlg2034.tlg003
urn:cts:greekLit:tlg2034.tlg014
urn:cts:greekLit:tlg2037.tlg001
urn:cts:greekLit:tlg2050.tlg001
urn:cts:greekLit:tlg2148.tlg001
urn:cts:greekLit:tlg2274.tlg001
urn:cts:greekLit:tlg2580.tlg001
urn:cts:greekLit:tlg2580.tlg002
urn:cts:greekLit:tlg2585.tlg001
urn:cts:greekLit:tlg3045.tlg001
urn:cts:greekLit:tlg4024.tlg001
urn:cts:greekLit:tlg4028.tlg001
urn:cts:greekLit:tlg4029.tlg001
urn:cts:greekLit:tlg4029.tlg002
urn:cts:greekLit:tlg4031.tlg003
urn:cts:greekLit:tlg4040.tlg001
urn:cts:greekLit:tlg4040.tlg029
urn:cts:greekLit:tlg4066.tlg003
urn:cts:greekLit:tlg4072.tlg002
urn:cts:greekLit:tlg4083.tlg006
urn:cts:greekLit:tlg4084.tlg001
urn:cts:greekLit:tlg4089.tlg001
urn:cts:greekLit:tlg4090.tlg176
urn:cts:greekLit:tlg7000.tlg001
urn:cts:greekLit:tlg9010.tlg001
urn:cts:latinLit:phi0474.phi039
urn:cts:latinLit:phi0474.phi040
urn:cts:latinLit:phi0474.phi043
urn:cts:latinLit:phi0474.phi044
urn:cts:latinLit:phi0474.phi049
urn:cts:latinLit:phi0474.phi050
urn:cts:latinLit:phi0474.phi053
urn:cts:latinLit:phi0474.phi055

urn:cts:latinLit:phi0474.phi057
urn:cts:latinLit:phi0474.phi70x07
urn:cts:latinLit:phi0588.abo007
urn:cts:latinLit:phi0588.abo009
urn:cts:latinLit:phi0588.abo011
urn:cts:latinLit:phi0588.abo012
urn:cts:latinLit:phi0684.phi001
urn:cts:latinLit:phi0684.phi002
urn:cts:latinLit:phi0860.phi001
urn:cts:latinLit:phi0881.phi001
urn:cts:latinLit:phi0899.phi001
urn:cts:latinLit:phi0914.phi001
urn:cts:latinLit:phi0978.phi001
urn:cts:latinLit:phi1002.phi001
urn:cts:latinLit:phi1017.phi016
urn:cts:latinLit:phi1038.phi001
urn:cts:latinLit:phi1056.phi001
urn:cts:latinLit:phi1236.phi001
urn:cts:latinLit:phi1254.phi001
urn:cts:latinLit:phi1348.abo012
urn:cts:latinLit:phi1348.phi012
urn:cts:latinLit:phi2331.phi001
urn:cts:latinLit:phi2331.phi005
urn:cts:latinLit:phi2331.phi006
urn:cts:latinLit:phi2331.phi010
urn:cts:latinLit:phi2331.phi011
urn:cts:latinLit:phi2331.phi012
urn:cts:latinLit:phi2331.phi018
urn:cts:latinLit:phi2331.phi019
urn:cts:latinLit:phi2331.phi020
urn:cts:latinLit:phi2331.phi021
urn:cts:latinLit:phi2331.phi023
urn:cts:latinLit:phi2331.phi024
urn:cts:latinLit:phi2331.phi025
urn:cts:latinLit:phi2331.phi026
urn:cts:latinLit:phi2331.phi029
urn:cts:latinLit:phi2331.phi030
urn:cts:latinLit:phi2349.phi007
urn:cts:latinLit:stoa0023.stoa001
urn:cts:latinLit:stoa0034.stoa001
urn:cts:latinLit:stoa0040.stoa003
urn:cts:latinLit:stoa0044.stoa001
urn:cts:latinLit:stoa0047.stoa003
urn:cts:latinLit:stoa0071b.stoa001
urn:cts:latinLit:stoa0084.stoa001
urn:cts:latinLit:stoa0085b.stoa001
urn:cts:latinLit:stoa0110.stoa009c
urn:cts:latinLit:stoa0121.stoa001
urn:cts:latinLit:stoa0128.stoa002
urn:cts:latinLit:stoa0128.stoa004
urn:cts:latinLit:stoa0159.stoa004

```
urn:cts:latinLit:stoa0162.stoa003        urn:cts:latinLit:stoa0203.stoa001
urn:cts:latinLit:stoa0163.stoa001        urn:cts:latinLit:stoa0264.stoa001
urn:cts:latinLit:stoa0167.stoa001        urn:cts:latinLit:stoa0275.stoa01
urn:cts:latinLit:stoa0171.stoa007        urn:cts:latinLit:stoa0275.stoa009
urn:cts:latinLit:stoa0171.stoa009        urn:cts:latinLit:stoa0275.stoa013
urn:cts:latinLit:stoa0186.stoa001        urn:cts:latinLit:stoa0275.stoa027
urn:cts:latinLit:stoa0192a.stoa001
```

The following 51 literary epithets have been added as metadata to the authors of the DFHG *Witnesses Catalog*:[197]

Anthologia, Anthologus, Antiquarius, Apologeta, Apologetica, Architectus, Astrologus, Astronomus, Atticista, Biographa, Biographus, Catena, Chronographa, Chronographus, Epicus, Epigrammatica, Epigrammaticus, Epistolographa, Geographus, Grammatica, Grammaticus, Hagiographus, Historica, Historicus, Jurisprudentia, Lexicographa, Lexicographus, Mathematicus, Medicus, Mythographa, Mythographus, Narratio Ficta, Naturalis Historia, Paradoxographa, Paradoxographus, Paroemiographa, Paroemiographus, Periegeta, Philologus, Philosophica, Philosophus, Poeta, Polyhistor, Rhetor, Rhetorica, Scholia, Scriptor Ecclesiasticus, Sophista, Tactitus, Theologus, Tituli.

The following 84 geographical epithets have been added as metadata to the authors of the DFHG *Witnesses Catalog*:[198]

Africanus, Alexandrinus, Amasiotes, Antiochenus, Aphrodisiensis, Arabicus, Armenius, Arpinas, Ascalonius, Atheniensis, Berytius, Bithynius, Bracarensis, Byzantius, Caesariensis, Calagurritanus, Carthaginiensis, Carystius, Chaeronensis, Chalcidensis, Chorenensis, Chrysopolitanus, Clagensis, Comensis, Constantiensis (Cypri), Constantinopolitanus, Cordubensis, Creticus, Cyprius, Cyrenaeus, Cyrrhensis, Damascenus, Dorylaeus, Edessenus, Emesenus, Epiphaniensis (Syriae), Eresius, Flavius Neapolitanus, Germanicus, Halicarnassensis, Hierapolitanus, Hierosolymitanus, Hipponensis, Hispalensis, Imbrius, Lemnius, Lydius, Macedonius, Madaurensis, Mamigonensis, Mediolanensis, Megalopolitanus, Milesius, Myrinaeus, Myrleanus, Mysius, Naucratites, Nicaeensis, Nucerinus, Palaestinus, Panites, Parius, Patavinus, Pellaeus, Pergamenus, Philadelphius, Prieneus, Reatinus, Rhodius, Romanus, Rosettanus, Samosatenus, Samothracenus, Sardianus, Siccensis, Siculus, Stagirites, Syrius, Syrus, Thessalonicensis, Thurius, Trallianus, Transpadanus, Tyrius.

The following 83 places have been added as metadata to the authors of the DFHG *Witnesses Catalog*:[199]

Africa, Alexandria, Amaseia, Antiochia, Aphrodisias, Arabia, Armenia, Arpinum, Ascalon, Athenae, Berytus, Bithynia, Bracara Augusta, Byzantium, Caesarea, Calagurris Nassica Iulia, Carthago, Chaeronea, Chalcis ad Belum, Chorene, Chrysopolis, Comum, Constantia, Constantinopolis, Corduba, Creta, Cyprus, Cyrene, Cyrrhus, Damascus, Dorylaion, Edessa, Emesa, Epiphaneia, Eresos, Flavia Neapolis, Germania, Glak, Halicarnassus, Hierapolis, Hierosolyma, Hippon, Hispalis,

---

197 Literary epithets are generally based on author epithets of the TLG *Canon*: see Berkowitz/Squitier (1990) xvii–xix.

198 Geographical epithets are generally based on geographical epithets of the TLG *Canon*: see Berkowitz/Squitier (1990) xx–xxii.

199 The different number of geographical epithets and places is due to the fact that *Syrius* and *Syrus* are both used for *Syria*.

Imbros, Karystos, Lemnos, Lydia, Macedonia, Madauros, Mamiki, Mediolanum, Megalopolis, Miletus, Myrina, Myrleia, Mysia, Naucratis, Nicaea, Nuceria, Palaestina, Panium, Paros, Patavium, Pella, Pergamum, Philadelpheia, Priene, Reate, Rhodos, Roma, Rosetta, Samosata, Samothrace, Sardis, Sicca Veneria, Sicilia, Stageira, Syria, Thessalonica, Thurii, Tralles, Transpadana, Tyrus.

Finally, in terms of chronology, these are the centuries represented in the DFHG *Witnesses Catalog*:

5 B.C., 5–4 B.C., 4 B.C., 4–3 B.C., 3 B.C., 3–2 B.C., 2 B.C., 2–1 B.C., 1 B.C., 1 B.C. – 1 A.D., 1 A.D., 1–2 A.D., 2 A.D., 2–3 A.D., 3 A.D., 3–4 A.D., 4 A.D., 4–5 A.D., 5 A.D., 5–6 A.D., 6 A.D., 6–7 A.D., 7 A.D., 8 A.D., 8–9 A.D., 9 A.D., 10 A.D., 10–11 A.D., 11 A.D., 11–12 A.D., 12 A.D., 13 A.D., 13–14 A.D., 15 A.D., 15–16 A.D., 16 A.D.

Figure 4.25. DFHG *Witnesses Catalog*: Phanodemus

These centuries are records in the database field `witness_date` and are visualized as metadata in the DFHG *Witnesses Catalog*. They are also represented in the *Witnesses Timeline* through the corresponding values in the fields `witness_date_in` and `witness_date_out`.[200] The database field `witness_date_note` contains the records "?" and "Varia" to express uncertain chronology and these records are visualized as metadata in the DFHG *Witnesses Catalog*.

Every web page of each `witness_author` has a list of passages with the corresponding *fragmenta* preserved by them. Figures 4.23 and 4.24 show that each fragment is accompanied by data about its relevant fragmentary author, fragmentary work, and FHG volume. Each fragmentary author and each fragment are linked to the DFHG *URN Retriever* (see p. 172). The last column of each row

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200 See section 4.4.2.3.

shows the icon ⚙ which is linkable for performing experimental text reuse detection.[201]

The DFHG *Witnesses Catalog* allows also to search fragmentary authors and fragmentary works of the FHG. In this case the aim is to display witnesses (authors and works) that preserve them in order to get an overview of the transmission of lost authors and works. Figure 4.25 shows a screenshot with the example of the first witnesses of Phanodemus (FHG I 366–370), who is searchable as `author` and accessible through the following link:

`http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=author|PH`
`ANODEMUS&onoffswitch=on`

Where author="THEOCLES"

CAIUS PLINIUS SECUNDUS
urn:cite:perseus:author.1141
Historicus, Rhetor - Comensis (Comum)
1 A.D.

Historia naturalis
urn:cts:latinLit:phi0978.phi001

PASSAGE	DFHG VOLUME	AUTHOR	WORK				FR.	TEXT REUSE
37.11.1	Volumen quartum	THEOCLES					2	⚙

CLAUDIUS AELIANUS
urn:cite:perseus:author.19
Sophista - Romanus (Roma)
2-3 A.D.

De natura animalium
urn:cts:greekLit:tlg0545.tlg001

PASSAGE	DFHG VOLUME	AUTHOR	WORK				FR.	TEXT REUSE
17.6	Volumen quartum	THEOCLES					1	⚙

FLAVIUS VOPISCUS (HISTORIA AUGUSTA)
urn:cite:perseus:author.1481
Biographus
?

Aurelianus
urn:cts:latinLit:phi2331.phi026

PASSAGE	DFHG VOLUME	AUTHOR	WORK			FR.	TEXT REUSE
6	Volumen tertium	THEOCLES	(VITAE CAESARUM)			1	⚙

Figure 4.26. DFHG *Witnesses Catalog*: Theocles

The web page provides a complete list of the witnesses of Phanodemus in alphabetical order by author. As described before, every witness has a *Perseus* CITE URN for the author, a *Perseus* CTS URN for the work, and metadata. Every witness has a list of the passages with the corresponding *fragmenta* of Phanodemus that

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201 On text reuse detection in the DFHG, see section 4.4.5.

Where work="ATTIKA"	

ATHENAEUS
urn:cite:perseus:author.228
Sophista - Naucratites (Naucratis)
2-3 A.D.

Deipnosophistae
urn:cts:greekLit:tlg0008.tlg001

PASSAGE	DFHG VOLUME	AUTHOR	WORK			FR.	TEXT REUSE
13.557a	Volumen primum	ISTER	ATTIKA			14	DA
11.472c	Volumen tertium	POLEMO ILIENSIS	ATTIKA			1	DA
11.486c	Volumen tertium	POLEMO ILIENSIS	ATTIKA			2	DA
13.587c	Volumen tertium	POLEMO ILIENSIS	ATTIKA			3	DA

CAIUS IULIUS HYGINUS
urn:cite:perseus:author.755
Philologus, Mythographus, Astronomus
1 B.C. - 1 A.D.

Figure 4.27. DFHG *Witnesses Catalog*: ATTIKA

they preserve.[202] In figure 4.25 the first witness is Athenaeus of Naucratis with his work *Deipnosophists*. In this case the last column — which is headed TEXT REUSE — includes not only the icon ⧉ but also the acronym **DA**, which stands for *Digital Athenaeus*. The reason is due to the fact that text reuse in the *Deipnosophists* of Athenaeus is detected through the *Digital Athenaeus* (**DA**) project.[203]

As it was previously mentioned, the FHG includes five homonymous authors who are not published in the same volume: see p. 172. An example is the name Theocles, who corresponds to two authors published in FHG III (665) and FHG IV (512). By searching the author Theocles in the DFHG *Witnesses Catalog*, it is possible to visualize a list of the witnesses of both authors named Theocles with metadata that allows to distinguish among them (fig. 4.26). Another example is the fragmentary work title Ἀττικά, which is searchable as work and accessible through this link (fig. 4.27):

http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=work|ATTI
KA&onoffswitch=on

In this case each passage of each witness lists the *fragmenta* that are classifed by Karl Müller as originally belonging to fragmentary works entitled ATTIKA.[204] Given that the structure of the FHG is not monolithic, there are other complexities represented in the DFHG *Witnesses Catalog*. An example of these complexities

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202 The order of the passages is by fragmentary work and by fragmentary number.
203 See section 4.4.5.
204 The order of the passages is by fragmentary author and fragment number.

is the record "No Witness Author" in the database field `witness_author`. This record is used for FHG authors who don't have a witness, by which we mean three different situations: 1) authors without fragments, 2) authors to whom Müller attributes works without fragments, and 3) authors who are preserved by inscriptions and manuscripts or whose texts are published according to certain editions.[205] The record "No Witness Author" is not present in the FHG, but has been added in order to avoid empty fields in the database and in order to represent fragmentary authors who have been published in the FHG with characteristics and structures different from those cited in the previous pages.[206]

Another complexity is represented by authors who are partly fragmentary and partly extant. An example already mentioned is Dionysius Halicarnassensis, who is both a witness and an author in the FHG (see p. 218). Figure 4.28 shows Dionysius Halicarnassensis as `author` in the DFHG *Witnesses Catalog*.[207] The web page displays the fragments of the *Antiquitates Romanae* preserved by a manuscript of the El Escorial collection (see p. 155). In this case the database represents the structure of the work of Dionysius with passages, books, and paragraphs as they are arranged by Karl Müller in the printed edition of the FHG.

Finally, the field `author` of the DFHG *Witnesses Catalog* includes also extant authors.[208] The reason for publishing these authors depends on the fact that collections of fragmentary authors are first of all collections of extant texts that preserve quotations and text reuses of lost authors and works, and in this respect the FHG is a perfect example. Accordingly, the DFHG *Witnesses Catalog* includes the *Bibliotheca* of Apollodorus Atheniensis and the two inscriptions of the *Marmor Parium* and of the *Marmor Rosettanum*. The database of the catalog represents the FHG structure of these works.[209] The Parian Marble and the Rosetta

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205 For a discussion about these authors, see p. 236.

206 The output of the search "No Witness Author" in the DFHG *Witnesses Catalog* reveals inconsistencies, because it includes metadata concerning the field `witness_author`. An example is the inscription CIG I 380, where the chronology (3 A.D.) is repeated twice and metadata about the literary epithet (*Tituli*) and the geography (*Atheniensis – Athenae*) are connected to the field `witness_author`: http://www.dfhg-project.org/Witnesses-Catalog /index.php?what[]=witness_author|No+Witness+Author&onoffswitch=on. The repetition of the chronology is due to the fact that in the database there are fields for the date of inscriptions and manuscripts (see below). These pieces of metadata allow to visualize the inscription in the map and in the timeline, but future developments of the DFHG *Witnesses Catalog* will rearrange them in separate fields.

207 http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=author|DIONYSIUS +HALICARNASSENSIS&onoffswitch=on

208 On the complex and ambiguous distinction between fragmentary and extant texts in the DFHG, see section 4.3.1.1.

209 E.g., http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=author|MARMO R+PARIUM&onoffswitch=on.

Figure 4.28. DFHG *Witnesses Catalog*: Dionysius Halicarnassensis (author)

Stone are classified both as `author` and as `witness_author` and `witness_work`.[210] Apollodorus Atheniensis is more complex, because in the FHG the name of the author is APOLLODORUS ATHENIENSIS and the title of his work is ΒΙΒΛΙΟΘΗΚΗΣ, while modern scholarship attributes the *Bibliotheca* to the so called Pseudo-Apollodorus.[211] Given that one of the aims of the DFHG *Witnesses Catalog* is to go beyond the FHG and connect its citations with external resources, this author is classified in the following way: APOLLODORUS ATHENIENSIS (`author`), ΒΙΒΛΙΟΘΗΚΗΣ (`work`), Pseudo-Apollodorus (`witness_author`), *Bibliotheca* (`witness_work`). The output of the search of the `author` Apollodorus Atheniensis displays him under the `witness_author` Pseudo-Apollodorus.[212]

Another interesting example in terms of complexities and expansion of data is represented by Heraclides Ponticus, who is an author published by Karl Müller in FHG II 197–224. In the DFHG *Witnesses Catalog* Heraclides Ponticus is searchable as `author`, but the output displays him under the `witness_author` Heraclides Lembus, who is also an `author` because published in FHG III 167–171. The reason is due to the fact that recent scholarship attributes the *excerpta* of the *Politeiai* to Heraclides Lembus (see p. 156).

The goal of this monograph is not to describe each example of the DFHG *Witnesses Catalog*. By navigating the catalog and comparing its entries with the printed edition of the FHG, it is possible to understand the complexities that we have to deal with when working with philological citations and fragmentary lit-

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210 For their classification as `witness_author` and as `witness_work`, see p. 216. The classification as `author` reflects their inclusion among the authors of the FHG, where they don't have a title, but only a section name.

211 On the use of the genitive for the work title, see p. 149 n. 50.

212 http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=author|APOLLODORUS+ATHENIENSIS&onoffswitch=on

erature. The catalog is rather a way for beginning a discussion about different possible models for digitizing and structuring philological citations of printed critical editions and for creating new forms of them in a born-digital critical environment. As a consequence of this discussion, the DFHG *Witnesses Catalog* has also addressed the problem of expanding data about editions, manuscripts, and inscriptions cited by Karl Müller and linking them with external resources.

The database of the DFHG *Witnesses Catalog* has seven fields for inscriptions, manuscripts, and editions: `Inscription`, `Inscription_date`, `Inscription_link`, `Manuscript`, `Manuscript_date`, `Manuscript_link`, `Edition`. The catalog currently contains 135 citations of 4 inscriptions: CIG I 380, CIG II 2905 (p. 573), IG XII 5, 444 and OGIS 90A. References to the *Corpus Inscriptionum Graecarum* (CIG) are present in the FHG, while those to the *Inscriptiones Graecae* (IG) for the *Marmor Parium* and to the *Orientis Graeci Inscriptiones Selectae* (OGIS) for the *Marmor Rosettanum* are additions because they were published after the publication of the FHG.[213] The addition of these collections is an example of the expansion of data of the FHG in order to provide links to external resources and further information about source texts originally collected by Karl Müller.[214]

Dates (`Inscription_date`) are based on their editions and expressed by centuries without further specifications.[215] If available, links (`Inscription_link`) are to the epigraphic collection of the *Packard Humanities Institute* (PHI), otherwise to the corresponding pages of the printed editions accessible through *Google Books.*

The catalog currently contains 592 citations of about 40 manuscripts.[216] Dates (`Manuscript_date`) of manuscripts are mainly provided according to the database *Pinakes. Textes et manuscrits grecs.*[217] If available, the catalog provides links (`Manuscript_link`) to digital collections of manuscripts, like the *Bibliotheca Palatina digital* of the University of Heidelberg.[218] An example is the *Codex Palatinus Graecus* 398 that is part of the Heidelberg collection, which provides access to a high resolution image of each page of the manuscript with a DOI and a citation link. The structure of the digital collection allows to access a specific section of the manuscript, as for example the *Mirabilia* of Phlegon Thrallianus (216r–236r),

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213 The first part of fascicle 5 of IG XII and the first volume of OGIS were both published in 1903.

214 IG and OGIS for the *Marmor Parium* and the *Marmor Rosettanum* have been chosen because they are still considered reference editions. Of course the goal would ideally be to add other corresponding later editions of these two inscriptions, but this kind of work has still to be manually performed and can be only part of a larger effort for a centralized catalog of witnesses of fragmentary literature.

215 See p. 227.

216 The number is not precise because there are cases where citations are ambiguous in the FHG. An example is the generic reference to a "Codex Parisinus" for fragment 27 of Mnaseas Patrensis.

217 On centuries of the DFHG *Witnesses Catalog*, see p. 227.

218 On this resource and its importance for the fragments of the Greek historians, see p. 75.

whose text is published in the third volume of the FHG (611–624).[219] Digital collections of historical documents with metadata and stable identifiers are growing every day. The possibility of visualizing high resolution images of manuscripts that preserve fragmentary authors and works is an invaluable service for scholars, but the problem is that these resources are not yet complete and centralized. Due to these limits and also to the limits of the FHG, the DFHG *Witnesses Catalog* is not meant to provide a definitive resource for getting information about the manuscripts collected by Karl Müller, but to begin individuate needs and issues for such a task.

Where edition="Bekker. Anecdota Graeca II. Berolini 1816"

SCHOLIA IN DIONYSIUM THRACEM
Scholia
   Varia

Ars grammatica
Bekker. Anecdota Graeca II. Berolini 1816

PASSAGE	DFHG VOLUME	AUTHOR	WORK			FR.	TEXT REUSE
p. 783	Volumen primum	HECATAEUS	ΓΕΝΕΑΛΟΓΙΑΙ			361	⊓
p. 783	Volumen secundum	DIONYSIUS MILESIUS				1	⊓
p. 783	Volumen secundum	ANAXIMANDER MILESIUS	ΗΡΩΟΛΟΓΙΑ			2	⊓
p. 783.1	Volumen secundum	ARISTOTELES	(ΕΥΡΗΜΑΤΑ)			256	⊓
p. 782.19	Volumen secundum	MENECRATES OLYNTHIUS				5	⊓
p. 782	Volumen secundum	DURIS SAMIUS	ΙΣΤΟΡΙΑΙ			16	⊓
p. 783.15	Volumen tertium	MNASEAS PATRENSIS	INCERTAE SEDIS			44	⊓
p. 786	Volumen tertium	MNASEAS PATRENSIS	INCERTAE SEDIS			44	
p. 783.14	Volumen quartum	DOSIADES	ΚΡΗΤΙΚΑ			4	⊓
p. 782.17	Volumen quartum	MENANDER EPHESIUS	ΦΟΙΝΙΚΙΚΑ			5	⊓
p. 783.6	Volumen quartum	PHILLIS DELIUS	ΠΕΡΙ ΧΡΟΝΩΝ			1	⊓

Figure 4.29. DFHG *Witnesses Catalog*: Bekker. *Anecdota Graeca* II. Berolini 1816

Another experiment has been performed with critical editions that are sometimes cited in the FHG as part of witnesses' references to fragments. The catalog currently contains 483 citations of 34 editions. In this case an effort has been done to find digital versions of these editions through *Google Books* and *Internet Archive*, and to provide links (`Witness_passage_link`) to their pages that are cited in the FHG.

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219 The URN of the entire manuscript is `urn:nbn:de:bsz:16-diglit-3033` and the DOI is ht tps://doi.org/10.11588/diglit.303. The corresponding web page shows metadata of the manuscript and links to its content. The folios with the work of Phlegon Thrallianus are available through the following DOI: https://doi.org/10.11588/diglit.303#0435. On digital collections of physical fragments, see section 2.1.4.

Figure 4.29 shows the example of the pages of the second volume of the *Anecdota Graeca* by Immanuel Bekker that are cited in the FHG as part of witnesses' references to fragments. The first column in the figure shows page numbers from the edition of Bekker with links to their corresponding pages in the digital version of the edition that is available through *Internet Archive*. In order to experiment with expansions of the resource, two editions that were published after the publication of the FHG have been added to the DFHG *Witnesses Catalog*: the two volumes of the *Pollucis Onomasticon* by Erich Bethe (1900, 1931) and the first volume of the *Scriptores originum Constantinopolitarum* by Theodor Preger (1901). As in the case of inscriptions, these editions allow to see the differences with the text published in the FHG and provide the entire context from which the fragments of the FHG have been extracted. Data collected in the DFHG *Witnesses Catalog* is used to generate three further resources that are described in the following sections: 1) *Witnesses Map*, 2) *Witnesses (Authors) Chart* and *Witnesses (Works) Chart*, and 3) *Witnesses Timeline*.

4.4.2.1 Witnesses Map

📖 Data collected in the DFHG *Witnesses Catalog* has been used to produce a *Witnesses Map*, which is an experiment for geolocating authors who preserve quotations and text reuses of fragmentary authors published in the *Fragmenta Historicorum Graecorum* using *Google Maps*.[220] The method adopted for creating the map is the same of the *Fragmentary Authors Map*.

Place names have been generated from geographical epithets of witnesses and places have been geolocated thanks to *Pleiades* Canonical URIs.[221] The difference is that, in the case of fragmentary authors, geographical epithets were provided by the FHG as part of author names (except for FHG I), while geographical epithets of witnesses are rarely included in the FHG and therefore a significant amount of time was devoted to add them using data from the TLG *Canon*, the *Perseus Catalog*, and the *Brill's New Pauly*.[222] The map has a search engine with the complete list of witnesses (authors) and of their relevant places in square brakets (e.g., `Plutarchus [Chaeronea]`). By hovering the mouse over each *Google Maps* pin, a pop-up window opens with the list of witnesses who are geolocated in that specific place, as in figure 4.30 where it is possible to see the example of witness authors from Athens.

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220 http://www.dfhg-project.org/Witnesses-Catalog/map.php
221 See section 4.4.1.1.
222 On geographical epithets of fragmentary authors and of witnesses, see pp. 197 and 226.
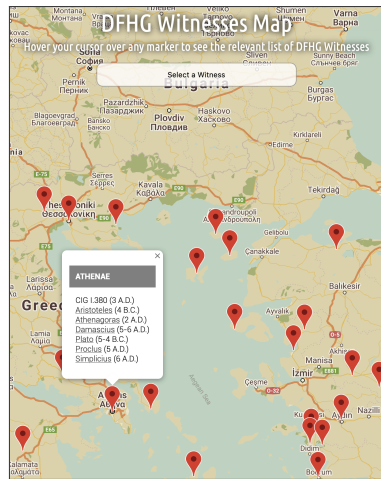
Figure 4.30. DFHG *Witnesses Map*: Athenae

By clicking an author name in the list, it is possible to open the corresponding web page of the author in the DFHG *Witnesses Catalog*.

4.4.2.2 Witnesses Charts

📊 Data of the DFHG *Witnesses Catalog* has been used to produce two charts: 1) witnesses (authors) chart[223] and 2) witnesses (works) chart.[224] These two charts have been generated with *Highcharts* and can be exported to different formats, such as PNG image, JPEG image, PDF document and SVG vector image.

The *Witnesses (Authors) Chart* visualizes the total number of witnesses (authors) of the FHG (244) and of their occurrences (10,339) with the corresponding fragmentary authors.[225] The aim of the chart is to show not only the number of witnesses, but also the number of fragmentary authors preserved by each of them. The chart extracts data from the field `witness_author` of the database of the DFHG *Witnesses Catalog*.[226] For each witness-author the chart shows the corresponding fragmentary authors of the FHG. By hovering the mouse over each blue bar, it is

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223 http://www.dfhg-project.org/Witnesses-Catalog/authors_chart.php
224 http://www.dfhg-project.org/Witnesses-Catalog/works_chart.php
225 As described in section 4.4.2, witnesses are distinguished between authors and works. The total number of witness-authors in the database of the DFHG *Witnesses Catalog* is 245, because one of them is labelled as "No Witness Author" (see p. 230).
226 This is the reason why editions, inscriptions, and manuscripts are not included in the chart: on these fields see section 4.4.2.

possible to see the list of the fragmentary authors who share the same witness-author. The witness-author with most occurrences is Stephanus Byzantius (1,287) and the witness-author with less occurrences is Gregorius Magistratus (1).

This chart reflects the work of Karl Müller and partly confirms results that have been already gained by Classical philology, but it also reveals new data and interesting aspects concerning the complexity of traditional classifications of printed critical editions. For example, figures 4.31 and 4.32 show the number of times that Harpocration and the *Suda* are mentioned in the FHG as witnesses of fragmentary authors. The chart reveals that Harpocration preserves 317 fragments of 56 historians, while the *Suda* preserves 288 fragments of 84 historians. We therefore have more fragments preserved by Harpocration, but belonging to lesser fragmentary authors than to those whose fragments are preserved by the *Suda*.

The chart has a line whose `witness_author` is "No Witness Author" with 204 occurrences and a list of 94 fragmentary authors.[227] 80 authors of this list don't have fragments in the FHG, while the remaining 14 authors are characterized by different situations:

– authors to whom are attributed works without fragments or fragments without a text (Apion Oasita, *De metallica disciplina*; Cornelius Alexander Polyhistor, Χαλδαϊκά; Hellanicus, fr. 148; Lysimachus Alexandrinus, Περὶ Ἐφόρου κλοπῆς; Theopompus, fr. 315);
– authors who have fragments coming from inscriptions (Dexippus Atheniensis, fr. 1; Maeandrius Milesius, fr. 7);
– authors who have fragments preserved by manuscripts (Aristoteles, fr. [274]; Dicaearchus Messenius, frr. 59–61; Joannes Antiochenus, frr. 2, 4, 6, 8, 11, 13, 15, 17, 20, 217, 218; Mnaseas Patrensis, fr. 27; Phlegon Trallianus, frr. 1, 29–64);
– authors who have fragments in the FHG that are published according to previous editions (Anonymus qui Dionis Cassii Historias continuavit; Callinicus Petraeus, fr. 1).

Given that the DFHG *Witnesses Catalog* includes also extant texts, the *Witnesses (Authors) Chart* visualizes them (see p. 230). In these cases there is a correspondence between `author` and `witness_author`, and the chart allows to see the number of their occurrences.[228]

The second chart is the *Witnesses (Works) Chart* that shows the total number of witnesses (works) of the FHG (458) and of their occurrences (10,085) with the corresponding fragmentary authors. The aim of the chart is to show not only the number of witnesses, but also the number of fragmentary authors preserved by

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227 On the meaning of "No Witness Authors" in the DFHG *Witnesses Catalog*, see p. 230.
228 An example is Pseudo-Apollodorus (Apollodorus Atheniensis) with 1,028 occurrences.
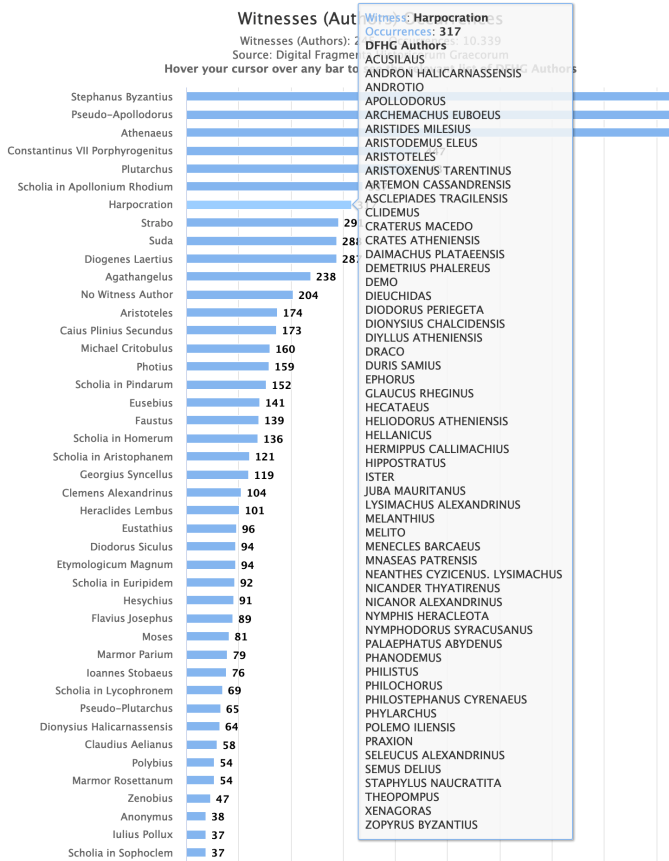
Figure 4.31. DFHG *Witnesses (Authors) Chart*: Harpocration

Figure 4.32. DFHG *Witnesses (Authors) Chart*: *Suda*

each of them. The chart extracts data from the field `witness_work` of the database of the DFHG *Witnesses Catalog*. For each witness-work the chart shows the corresponding fragmentary authors of the FHG. By hovering the mouse over each blue bar, it is possible to see the list of the fragmentary authors who share the same witness-work. The witness-work with most occurrences is the *Ethnica* of Stephanus Byzantius (1,286) and the witness-work with less occurrences is the *De mensuribus et ponderibus* of Epiphanius (1).

4.4.2.3 Witnesses Timeline

🕐 The *Witnesses (Authors) Timeline* is an experiment to visualize the chronological distribution of the witness-authors of the *Fragmenta Historicorum Graecorum*.[229] The timeline has been generated with *Highcharts* and can be exported to different formats, such as PNG image, JPEG image, PDF document and SVG vector image. The timeline extracts records from the fields `witness_date_in` and `witness_date_out` of the database of the DFHG *Witnesses Catalog*, which allow to represent centuries before and after Christ (fig. 4.33).[230]
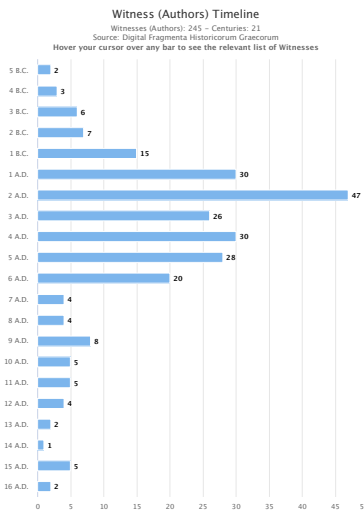
Figure 4.33. DFHG *Witnesses (Authors) Timeline*

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229 http://www.dfhg-project.org/Witnesses-Catalog/timeline.php
230 On chronological data in the DFHG *Witnesses Catalog*, see p. 227.

4.4.3 Müller-Jacoby Table of Concordance

⇄ The *Müller-Jacoby Table of Concordance* is an add-on that for the first time allows to find concordances between ancient Greek fragmentary historians published in the *Fragmenta Historicorum Graecorum* of Karl Müller and in *Die Fragmente der griechischen Historiker* of Felix Jacoby including the *continuatio* and the *Brill's New Jacoby*.[231] This concordance complements the FGrHist and the *Jacoby Online*, which provide incomplete or absent concordances to FHG authors.[232]

In the FGrHist Felix Jacoby publishes an incomplete concordance between his edition and the FHG. This concordance is constituted by four different concordances that are printed at the end of four volumes of the FGrHist and that are divided into a concordance of fragments (*Konkordanz der Fragmentzahlen zwischen FGrHist(Jac) and C. Muellers Fragm. Hist. Graec.(Mü)*) and an *Index auctorum*.[233] In the *Konkordanz der Fragmentzahlen* Jacoby lists only a selection of FGrHist authors for whom he provides correspondences with the FHG at the level of both authors and fragments.[234] In the *Indices auctorum* of FGrHist I–II Jacoby lists all the other FGrHist authors and their correspondent FHG authors, but without a correspondence of fragments. In the *Index auctorum* of FGrHist III the correspondence with the FHG is missing.[235]

The *Müller-Jacoby Table of Concordance* ingests concordances and indices of the FGrHist and fill them in with data not provided by Felix Jacoby. Considering the complexity of the FHG and of the FGrHist, which is evident by consulting the *Konkordanzen* and the *indices auctorum* of the FGrHist, the concordance of the DFHG project provides correspondences for authors and not for fragments

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231 http://www.dfhg-project.org/Mueller-Jacoby-Concordance/
232 On the printed edition of the FGrHist see pp. 35 ff. On the *Jacoby Online* project, see section 2.1.2.
233 FGrHist IA 43–52 (concordance for FGrHist I and *index auctorum*); IIB 1237–1257 (concordance for FGrHist II and *index auctorum* for FGrHist I–II); IIIB 759–779 (concordance for FGrHist IIIAB and *index auctorum* for FGrHist I–IIIB); IIIC 944–964 (concordance for FGrHist IIIC and *index auctorum* for FGrHist I–IIIC).
234 One of the characteristics of the printed edition of the FGrHist is that Jacoby usually adds numbers of FHG fragments that correspond to numbers of FGrHist fragments. This information is missing in the online version of the FGrHist in the *Jacoby Online* project.
235 The publication of the FGrHist lasted many years and the difficulties and challenges of this gigantic plan can be seen also through the *Konkordanzen* and the *indices auctorum*, where Jacoby sometimes mentions authors he would have published in later volumes or authors he never published and who are now published as part of FGrHist IV and V. Examples are Aisopos and Pherekydes von Leros, who are numbered as 55a and 55b in the *index auctorum* of FGrHist I, but who were later published with numbers 187a and 475. Another example is Diogenianus (or Diogenianos), who is mentioned in the *indices auctorum* of FGrHist I–II and I–IIIB, but who has been recently published in FGrHist V with the number 2015a. Except for the *Konkordanzen* and the *index auctorum* of FGrHist I–IIIC, the other *indices* of the FGrHist are available in the *Jacoby Online* website.

(see figure 4.34). A complete concordance of fragments is a work that requires a significant investment in terms of time and human resources, because there are many complexities and ambiguities that have to be identified and represented in a digital environment.[236] Also, data is still missing because the *Jacoby Online* is not yet finished and because, in the current state of the Brill's project, it is not possible to automatically export identifiers (URLs) of fragments from the online website.

FHG_author = "Aristonicus Tarentinus"							
FHG	Volume: FHG 4	Author: Aristonicus Tarentinus	Pages: 337	Fragment: 3	Paper Edition	DFHG	urn:cite:lofts:fhg.4.aristonicus_tarentinus
FGrHist		Author: Aristonikos von Alexandreia	Number: 53			Jacoby OnLine	
BNJ 1		Author: Aristonikos of Alexandria	Number: 53			Jacoby OnLine	
BNJ 2		Author: Aristonikos of Alexandria	Number: 53			Jacoby OnLine	
FHG	Volume: FHG 4	Author: Aristonicus Tarentinus	Pages: 337		Paper Edition	DFHG	urn:cite:lofts:fhg.4.aristonicus_tarentinus
FGrHist		Author: Aristonikos von Tarent	Number: 57			Jacoby OnLine	
BNJ 1		Author: Aristonikos of Tarentum	Number: 57			Jacoby OnLine	
BNJ 2		Author: Aristonikos of Tarentum	Number: 57			Jacoby OnLine	
Perseus Catalog		Author: Aristonicus Tarentinus				Perseus Catalog Entry	

Figure 4.34. *Müller-Jacoby Table of Concordance*: Aristonicus Tarentinus

The goal of the *Müller-Jacoby Table of Concordance* is to combine data produced in the DFHG project, data extracted from the *Jacoby Online*, and information collected from the printed edition of the FGrHist. The concordance includes all the authors published in the FHG, in the FGrHist, and in the *Brill's New Jacoby* (1st and 2nd edition), because the main focus is on the close relation among these three collections.[237] Given that the *continuatio* of the FGrHist and the BNJ are still open projects, their authors are progressively added to the concordance as soon as they are published in the *Jacoby Online*.[238] Karl Müller authored also other editions that collect fragmentary authors which have been included in the DFHG concordance, but only for those authors who have a correspondence in the FHG.[239] Finally, the *Müller-Jacoby Table of Concordance* includes CITE URNs of FHG authors and links to corresponding entries of the *Perseus Catalog*.[240]

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236 Three months of mostly manual work have been invested for producing the *Müller-Jacoby Table of Concordance*.

237 On the relationship between the works of Karl Müller and Felix Jacoby and on the differences between their two editions, see section 4.1.

238 I'm very grateful to Ernest Suyver and to the editorial team of the *Jacoby Online* project for constantly keeping me up to date with new published entries.

239 Müller (1855–1861); Dindorf/Müller (1858); Dübner/Müller (1846). These references are also present in the *Konkordanzen* and in the *indices auctorum* of the printed edition of the FGrHist.

240 On CITE URNs of the DFHG project, see p. 176.

Search fields of the *Müller-Jacoby Table of Concordance* are: 1) `FHG volume number` (e.g., FHG 3); 2) `FHG page number` (e.g., 617–622); 3) `FHG author name` (e.g., Stesimbrotus Thasius); 4) `FGrHist author name` (e.g., Hellanikos von Lesbos); 5) `FGrHist author number` (e.g., 323a);[241] 6) `BNJ 1 author name` (e.g., Akousilaos of Argos); 7) `BNJ 1 author number` (e.g., 2); 8) `BNJ 2 author name` (e.g., Aristonikos of Tarentum); 9) `BNJ 2 author number` (e.g., 57). The concordance allows to combine filters using logical `AND/OR` expressions to obtain a more precise selection. For example, it is possible to get data of all the sections about Hellanikos von Lesbos in the FGrHist (4, 323a, 601a, 608a, 645a, 687a) or only of the section numbered 323a. The Output of the concordance displays the following data, if available:

– `FHG` volume number, author name, pages (with fragments when corresponding to specific authors in the FGrHist and the BNJ), link to the printed edition of the *Fragmenta Historicorum Graecorum* in *Internet Archive*, DFHG URLs, and CITE URNs;[242]
– `SRAM` author name, pages, and link to the printed edition of the *Scriptores Rerum Alexandri Magni* by Friedrich Dübner and Karl Müller in *Google Books* (only for corresponding authors in the FHG, FGrHist, and BNJ);
– `GGM` volume number, author name, pages, and link to the printed edition of the *Geographi Graeci Minores* by Karl Müller in *Google Books* (only for corresponding authors in the FHG, FGrHist, and BNJ);
– `Herodot.` author name, pages, and link to the printed edition of the *Herodoti Historiarum libri ix* by Wilhelm Dindorf and Karl Müller in *Google Books* (only for corresponding authors in the FHG, FGrHist, and BNJ);
– `FGrHist` author name, author number, and link to the *Jacoby Online*;
– `BNJ 1` author name, author number, and link to the *Jacoby Online*;
– `BNJ 2` author name, author number, and link to the *Jacoby Online*;[243]
– `Perseus Catalog` author name and link to the *Perseus Catalog* entry.

Author names and numbers in the DFHG concordance faithfully represent forms used by Karl Müller, Felix Jacoby, and other scholars who have been contributing to the *continuatio* of the FGrHist and to the BNJ. As far as the FGrHist and the

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241 Authors in the FGrHist are identified by unique numbers sometimes with the addition of letters. This is the reason why the DFHG concordance doesn't include a reference to the FGrHist parts (I, II, III, IV and V). For an overview of the organization of the FGrHist, see the *Jacoby Online* project website.

242 FHG fragments corresponding to specific authors in the FGrHist and the BNJ are fr. 3 of *Maeandrius Milesius (Leander Milesius)* (FHG II 335), fr. 7 of *Neanthes Cyzicenus. Lysimachus* (FHG III 4), fr. 14 of *Metrodorus Scepsius* (FHG III 205), fr. 12 of *Aristodemus Thebanus* (FHG III 311), fr. 3 of *Aristonicus Tarentinus* (FHG IV 337), and frr. 7–8 of *Dositheus* (FHG IV 402).

243 The *Müller-Jacoby Table of Concordance* provides URLs for each author of the FGrHist, BNJ 1, and BNJ 2 available in the *Jacoby Online* website, whose access to the full version requires a subscription through the publisher Brill or through an institution.

BNJ are concerned, entries are expressed according to the *Jacoby Online*, whose language may slightly differ from the printed edition. As of 2021, the *Müller-Jacoby Table of Concordance* includes 1,094 entries from the FGrHist, 865 entries from BNJ 1, and 254 entries from BNJ 2.[244] A complete list of the authors of the concordance, together with the 636 authors of the FHG, is available through a separate web page of the DFHG concordance (fig. 4.35).[245]

Müller-Jacoby Table of Concordance

Alphabetical lists of ancient Greek fragmentary historians

FHG	FGrHist	BNJ 1	BNJ 2
1. (Leonides)	1. A. Postumius Albinus (812)	1. Andreas of Panormos (571)	1. Abaris (34)
2. (Paxamus)	2. Abaris (34)	2. (A. Licinius) Archias of Antioch (186)	2. Abas (46)
3. (Philalius Corinthius)	3. Abas (46)	3. (C. Iulius) Polybios (254)	3. Ablabius (708)
4. Abas	4. Ablabius (708)	4. (Ps.-)Petosiris (663)	4. Aethlios of Samos (536)
5. Abron vel Habron Batiensis	5. Abydenos (685)	5. Abaris (34)	5. Agathokles of Samos (799)
6. Abydenus	6. Aelius Dios (629)	6. Abas (46)	6. Agesilaos (828)
7. Acesander	7. Aelius Sarapion (1087)	7. Ablabius (708)	7. Agroitas (762)
8. Acestodorus vel Acestorides	8. Aelius Serenus (1082)	8. Abydenos (685)	8. Akesandros of Cyrene (469)
9. Achaeus	9. Aethlios von Samos (536)	9. Acilius (813)	9. Alexander (739)
10. Acusilaus	10. Agaklytos (411)	10. Aethlios of Samos (536)	10. Alexarchos (829)
11. Adaeus Mytilenaeus	11. Agatharchides von Knidos (86)	11. Agaklytos (411)	11. Anaxis of Boiotia (67)
12. Aelius Dius	12. Agatharchides von Samos (284)	12. Agatharchides of Knidos (86)	12. Androkles (751)
13. Aelius Harpocration	13. Agathemeros (2102)	13. Agatharchides of Samos (284)	13. Andronikos of Laodikeia (579A)
14. Aeneas	14. Agathokles von Kyzikos (der Babylonier) (472)	14. Agathokles (472)	14. Androsthenes of Thasos (711)
15. Aenesidemus	15. Agathokles von	15. Agathokles of Samos (799)	15. Anonymous Annals (Ann Annales) (5...)
16. Aethlius Samius			
17. Agaclytus			
18. Agathange			

DFHG Project [cc] BY-SA

Figure 4.35. *Müller-Jacoby Table of Concordance*: fragmentary historians in different editions

4.4.4 OCR Editing

✏ *OCR Editing* is an add-on of the DFHG project for experimenting with Optical Character Recognition (OCR) post-correction. The printed edition of the FHG has been OCRed by the social enterprise *Digital Divide Data* (DDD) and released in five text files with a basic XML encoding that represents the layout of each volume (see p. 143). Like other editions that have been OCRed as part of the *Open Greek and Latin* project, the output of the FHG has not been proofread and still

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244 These entries correspond to a total of 457 authors in the *Perseus Catalog*.
245 http://www.dfhg-project.org/Mueller-Jacoby-Concordance/editions.php

contains OCR errors.[246] As for now, implementing a complete workflow for OCR post-correction is out of the scope of the DFHG project, because such a task can be only part of large-scale digitization projects. Nevertheless, in order to make the community of scholars aware of the current state of OCR technologies applied to critical editions of Classical sources, the DFHG project has implemented a web interface for OCR post-correction based on models of crowd-sourcing projects.[247]

Figure 4.36. DFHG *OCR Editing*

This functionality is accessible through the DFHG *Search* and through the DFHG *URN Retriever*. When searching DFHG contents or retrieving passages of DFHG texts, results display the *edit* icon 🖋 on the right of the page in correspondence of each fragment (fig. 4.14).[248] By clicking the icon, users get access to a new window for suggesting corrections of references to witnesses and of texts of fragments, Latin translations, and commentaries (fig. 4.36). The window doesn't request a registration, but only the name of the Submitter and a validation through the reCAPTCHA system.[249] The correction is ingested in a database and validated by the DFHG project team through an administration page.

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246 On results of OCR for ancient Greek and critical editions of Classical sources, see Piotrowski (2012) 34–37, Robertson/Boschetti (2017), and Robertson (2019). The files with the OCR output of the FHG provided by DDD missed pages, that were later OCRed and post-corrected as part of the DFHG project: the entire section of the *Marmor Rosettanum* and its index was missing in FHG I, 6 pages were missing in FHG II, 9 pages were missing in FHG III, 14 pages were missing in FHG IV, and 2 pages were missing in FHG V.

247 On collaborative correction of OCR output, see Piotrowski (2012) 43–48. For projects of cultural heritage that involve crowdsourcing and include OCR, see Ridge (2015) and Ridge (2016).

248 On the *Search* function of the DFHG and on the *URN Retriever*, see sections 4.3.3 and 4.3.5. The edit functionality works only for fragments.

249 On the use of reCAPTCHA for collaborative OCR correction, see Piotrowski (2012) 45–48.

In the Summer 2016 the *OCR Editing* of the DFHG project was experimented by a group of three graduate students in Classics, who were selected to participate in the *CHS Summer Internship in Publications*. The internship was held at the Harvard's Center for Hellenic Studies in Washington DC and organized in collaboration with the Alexander von Humboldt Chair of Digital Humanities at the University of Leipzig as part of the *Free First Thousand Years of Greek* (FF1KG) project.[250] During the CHS Summer Internship, the three students worked two hours per day for two weeks (June 16–30, 2016) on the *Digital Fragmenta Historicorum Graecorum* project and on the *Digital Athenaeus* project.[251] As for the DFHG, assignments included work on data citation and catalog entries of FHG texts, on extracting combined searches in the DFHG *Digger* and in the DFHG *Search*, on aligning Greek fragments with their Latin translations in the *Alpheios* alignment editor, and on OCR post-correction.[252] As far as OCR is concerned, students edited minor errors (e.g., punctuation and capitalization) of 64 fragments of the first volume of the FHG. The assignment was not only focusing on OCR corrections with a sequential approach to the text, but also correcting texts that resulted from searches in the collection to explore the structure of fragmentary works and to analyse the language of fragmentary historiography.

The CHS Summer Internship was a lucky situation with a group of graduate students in Classics, who were selected and supported by a renown institution for working on a digital project whose aim is to edit and publish ancient Greek and Latin data. As part of this opportunity, the DFHG project benefited in terms of experiments and results, but this is not the usual situation in academic teaching and research projects. This is the reason why OCR post-correction at large scale still remains an open question for projects on historical and philological documents.[253]

4.4.5 Text Reuse Detection

The DFHG project offers automatic text reuse detection of fragmentary works in their witnesses. As described in chapter 2, there are projects that have been experimenting with the application of text reuse detection to historical documents.

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250 On the FF1KG project and on the *CHS Summer Internships in Publications*, see Muellener (2019). The three students were Caitlin Miller (Yale University), Josh Blecher-Cohen (Harvard University), and Jack Duff (University of Massachusetts). The Summer Internship was held from June 1 through July 31, 2016.

251 At the time, the DFHG project was still in progress and offered access only to the first volume of the *Fragmenta Historicorum Graecorum*.

252 On Alpheios, see p. 101.

253 On this note, cf. the review of the DFHG project by Buxton (2018).

In these cases the detection is performed for text reuses of still surviving sources, where it is possible to compare the reuse with the original text from which the reuse itself derives.[254]

Classical fragmentary historiography mostly detects reuses of *lost* authors and works, which means that the original versions are lost and that the analysis has to be conducted only in the extant textual reuses. The technology for detecting reuses of lost texts has still to come and requires the production of more digital resources and training data. This is the reason why the DFHG project adopts text reuse detection to compare the version of the witnesses of fragments that were published by Karl Müller in the *Fragmenta Historicorum Graecorum* with other editions of these witnesses that are available in a digital format. This kind of detection allows to analyze how quotations and text reuses are extracted from their witnesses and edited by Karl Müller in his critical edition of fragmentary authors and works.

For reasons of sustainability, the DFHG project has not implemented new text reuse algorithms, but makes use of a PHP implementation of the *Smith-Waterman Algorithm* that performs local sequence alignment to detect similarities between strings using words as tokens. This algorithm has been used for sequencing DNA and for detecting plagiarism and collusion by comparing sequences of text.[255] Text reuse can be detected through the DFHG *Witnesses Catalog* (http://www.dfhg-project.org/Witnesses-Catalog), where each text passage published in the FHG is aligned with the collections of XML files of Classical sources of the *Perseus Digital Library* and of the *Free First Thousand Years of Greek* (FF1KG) of the *Open Greek and Latin* project.[256]

As described at p. 228, for each FHG text passage the catalog provides text reuse through the icon 🧩 in a column which is headed TEXT REUSE.[257] By clicking on the icon, a new window opens with the text of the selected passage. Figure 4.37 shows the example of Hdt. 4.36 (= FHG I, Hecataeus fr. 1) that has been selected from the list of passages of the *Historiae* of Herodotus that are collected in the FHG as witnesses of historical fragments (cf. fig. 4.23). The window offers two possibilities for performing text reuse detection: 1) insert the URL of an XML file of the text of the *Historiae* of Herodotus; 2) select one of the availale editions of the *Historiae* of Herodotus from the *Perseus Digital Library*. If we select and submit `tlg0016.tlg001.perseus-grc2`, the system aligns the text of Hdt. 4.36 pub-

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254 See section 2.3.1.

255 This algorithm is used also as part of the project *Passim*: https://github.com/dasmiq/pass im/tree/master/src/main/java/JAligner.

256 For both collections see https://github.com/PerseusDL and http://opengreekandlatin.org. On the FF1KG project, see Muellener (2019).

257 See, for example, fig. 4.23. If the icon 🧩 is not present, this means that there isn't a text in the FHG.

Figure 4.37. DFHG *Text Reuse Detection*: Hdt. 4.36

lished in the FHG as fragment 1 of Hecataeus with the *Perseus* XML version of the text of the *Historiae* of Herodotus based on the edition of Alfred Denis Godley (Loeb 1921–1924): https://github.com/PerseusDL/canonical-greekLit/tree /master/data/tlg0016/tlg001. The result of the detection shows the text of FHG Hecataeus fr. 1 and the corresponding text highlighted in yellow in the edition of the *Historiae* by Godley (fig. 4.38). The web page shows also the corresponding passage of the *Perseus* XML file where an attribute @ana with the value "DFHG" has been automatically added to the element <p> of the relevant passage (Hdt. 4.36.2) in order to mark up the presence of a fragment according to the FHG. The modified *Perseus* XML file can be downloaded. The yellow highlighted passage contains grey words that mean a difference with the text published in the FHG. In this case there are the following differences: lowercase words (γελῶ instead of **Γελῶ**), OCR errors and different words (νοονεχόντως instead of **νόον ἔχοντας**), different accents (οἳ instead of **οἵ**), absence of punctuation (πέριξ instead of **πέ-ριξ**, and κυκλοτερέα instead of **κυκλοτερέα,**) and a different accent with absence of a particle (τὴν instead of **τήν τε.**)[258]

An interesting case is when paragraphs in the FHG are different from those of other editions. If we select Hdt. 2.143 (= FHG I, Hecataeus fr. 276) from the list of passages shown in figure 4.23 and we compare the Herodotean passage of the FHG with the edition of Godley, we see that text reuse detection is split into the corresponding four paragraphs of chapter 143 of the second book of the *Historiae* in the Loeb edition.[259]

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258 As every distance algorithm, the *Smith-Waterman Algorithm* returns a percent score of similarity that detects similarities between two strings. This percent score has to be interpreted by determining a threshold value for evaluting if the requested text is detected or not. After a series of experiments, the threshold value was set to 0.2.

259 Possible inconsistencies in the results of text reuse detection are due to the inconsistencies of the structure of the XML files that are aligned with the requested FHG text passages.

Figure 4.38. DFHG *Text Reuse Detection*: Hdt. 4.36

Figure 4.39. DFHG *Text Reuse Detection*: Plut., *Alex.* 46

TEXT REUSE DETECTION

Παράκειται δ αὐτῷ (τῷ Ἰσμηνῷ) Κιθαιρὼν ὄρος,
ὀνομαζόμενον δὲ πρότερον Ἀστέριον, δι αἰτίαν
τοιαύτην. Βοιωτοῦ τοῦ Ποσειδῶνος ἐκ δυοῖν γυναικῶν
τῶν ἐπισήμων θέλοντος γῆμαι τὴν ὠφελιμωτέραν, καὶ
ἐν ταῖς ἀκρωρείαις λόφου τινὸς ἀνωνύμου νυκτὸς
περιμένοντος ἀμφοτέρας, αἰφνίδιος ἐξ οὐρανοῦ
κατενεχθεὶς ἀστὴρ ἔπεσε τοῖς Εὐρυθεμίστης ὤμοις,
καὶ ἀφανὴς ἐγένετο. Βοιωτὸς δὲ τὸ σημαινόμενον
νοήσας, τὴν μὲν κόρην ἔγημε, τὸ δ ὄρος ὠνόμασεν

https://raw.githubusercontent.com/OpenGreekAndLatin/First1K   Submit

Pseudo-Plutarch - De Fluviis [tlg0094.tlg001.1st1K-grc1.xml] (OGL)

Searching LEO BYZANTIUS fr. 2 [Pseudo-Plutarchus]

Παράκειται δ' αὐτῷ (τῷ Ἰσμηνῷ) Κιθαιρὼν ὄρος, ὀνομαζόμενον δὲ πρότερον Ἀστέριον, δι' αἰτίαν τοιαύτην. Βοιωτοῦ τοῦ Ποσειδῶνος ἐκ δυοῖν γυναικῶν τῶν ἐπισήμων θέλοντος γῆμαι τὴν ὠφελιμωτέραν, καὶ ἐν ταῖς ἀκρωρείαις λόφου τινὸς ἀνωνύμου νυκτὸς περιμένοντος ἀμφοτέρας, αἰφνίδιος ἐξ οὐρανοῦ κατενεχθεὶς ἀστὴρ ἔπεσε τοῖς Εὐρυθεμίστης ὤμοις, καὶ ἀφανὴς ἐγένετο. Βοιωτὸς δὲ τὸ σημαινόμενον νοήσας, τὴν μὲν κόρην ἔγημε, τὸ δ' ὄρος ὠνόμασεν Ἀστέριον ἀπὸ τοῦ συγκυρήματος. Ὕστερον δ' ἐκλήθη Κιθαιρὼν δι' αἰτίαν τοιαύτην. Τισιφόνη μία τῶν Ἐρινύων, εἰς ἐπιθυμίαν ἐμπεσοῦσα παιδὸς εὐπρεποῦς, Κιθαιρῶνος τοὔνομα, καὶ μὴ στέγουσα τὴν ἐπίτασιν τῶν ἐρώτων, λόγους αὐτῷ περὶ συνόδων ἀπέστειλεν· ὁ δὲ τὸ καταπληκτικὸν τῆς προειρημένης φοβηθείς, οὐδ' ἀποκρίσεως αὐτὴν ἠξίωσεν· ἡ ἀποτυχοῦσα τῆς προαιρέσεως, ἐκ τῶν πλοκάμων ἕνα τῶν δρακόντων ἀπέσπασεν, καὶ ἐπὶ τὸν ὑπερήφανον ἔβαλεν· ὁ δ' ὄφις τοῖς κόλποις περισφίγξας αὐτὸν ἀνεῖλεν, Ἀστερίου ποιμαίνοντος ἐν ταῖς ἀκρωρείαις. Κατὰ δὲ πρόνοιαν θεῶν, τὸ ὄρος ἀπ' αὐτοῦ μετωνομάσθη Κιθαιρών, καθὸ ἱστορεῖ Λέων ὁ Βυζάντιος ἐν τοῖς Βοιωτιακοῖς.

Found in Pseudo-Plutarch - De Fluviis

Παράκειται δ' αὐτῷ (τῷ Ἰσμηνῷ) Κιθαιρὼν ὄρος, ὀνομαζόμενον δὲ πρότερον Ἀστέριον, δι' αἰτίαν τοιαύτην. Βοιωτοῦ τοῦ Ποσειδῶνος ἐκ δυοῖν γυναικῶν τῶν ἐπισήμων θέλοντος γῆμαι τὴν ὠφελιμωτέραν, καὶ ἐν ταῖς ἀκρωρείαις λόφου τινὸς ἀνωνύμου νυκτὸς περιμένοντος ἀμφοτέρας, αἰφνίδιος ἐξ οὐρανοῦ κατενεχθεὶς ἀστὴρ ἔπεσε τοῖς Εὐρυθεμίστης ὤμοις, καὶ ἀφανὴς ἐγένετο. Βοιωτὸς δὲ τὸ σημαινόμενον νοήσας, τὴν μὲν κόρην ἔγημε, τὸ δ' ὄρος ὠνόμασεν Ἀστέριον ἀπὸ τοῦ συγκυρήματος. Ὕστερον δ' ἐκλήθη Κιθαιρὼν δι' αἰτίαν τοιαύτην. Τισιφόνη μία τῶν Ἐρινύων, εἰς ἐπιθυμίαν ἐμπεσοῦσα παιδὸς εὐπρεποῦς, Κιθαιρῶνος τοὔνομα, καὶ μὴ στέγουσα τὴν ἐπίτασιν τῶν ἐρώτων, λόγους αὐτῷ περὶ συνόδων ἀπέστειλεν· ὁ δὲ τὸ καταπληκτικὸν τῆς προειρημένης φοβηθείς, οὐδ' ἀποκρίσεως αὐτὴν ἠξίωσεν· ἡ ἀποτυχοῦσα τῆς προαιρέσεως, ἐκ τῶν πλοκάμων ἕνα τῶν δρακόντων ἀπέσπασεν, καὶ ἐπὶ τὸν ὑπερήφανον ἔβαλεν· ὁ δ' ὄφις τοῖς κόλποις περισφίγξας αὐτὸν ἀνεῖλεν, Ἀστερίου ποιμαίνοντος ἐν ταῖς ἀκρωρείαις. Κατὰ δὲ πρόνοιαν θεῶν, τὸ ὄρος ἀπ' αὐτοῦ μετωνομάσθη Κιθαιρών, καθὸ ἱστορεῖ Λέων ὁ Βυζάντιος ἐν τοῖς Βοιωτιακοῖς.

```
<div type="textpart" subtype="section" n="2">
<p ana="DFHG">2. Παράκειται δὲ αὐτῷ Κιθαιρὼν ὄρος, ὀνομαζόμενον
δὲ πρότερον Ἀστέριον δι᾽ αἰτίαν τοιαύτην. Βοιωτοῦ
τοῦ Ποσειδῶνος ἐκ δυεῖν γυναικῶν τῶν ἐπισήμων
θέλοντος γῆμαι τὴν ὠφελιμωτέραν καὶ ἐν ταῖς ἀκρωρείαις
λόφου τινὸς ἀνωνύμου νυκτὸς περιμένοντος ἀμφοτέρας,

<pb n="640"/>
αἰφνίδιος ἐξ οὐρανοῦ κατενεχθεὶς ἀστὴρ ἐνέπεσεν
τοῖς Εὐρυθεμίστης ὤμοις καὶ ἀφανὴς ἐγένετο.
```

Figure 4.40. DFHG *Text Reuse Detection*: [Plut.], *De fluv.* 2.2

Figure 4.41. DFHG *Text Reuse Detection*: Corn. Nep., *Con.* 5

Another example is when Karl Müller classifies the first part of the first paragraph of chapter 46 of the *Alexander* of Plutarch as fragment 64 of Ister (FHG I 427). In this case he also adds a reference to the edition of Plutarchus by Henricus Stephanus that he was consulting ("Plutarch. Alexand. p. 691 Frf., 1267 ed. Steph. seu cap. 46"). A comparison of this passage with the *Perseus* XML version of the edition of the *Alexander* of Plutarch by Bernadotte Perrin (Heinemann 1919: `tlg0007.tlg047.perseus-grc2`) reveals that Karl Müller was accepting the edition of Stephanus that keeps the reading of the manuscripts where appears the form Πολύκριτος. Later scholarship accepts the correction of this name with the form Πολύκλειτος, which is also present in the edition of Perrin (fig. 4.39).[260]

As mentioned before, text reuse detection in the DFHG is performed not only on texts of the *Perseus Digital Library*, but also on editions that have been digitized as part of the *Free First Thousand Years of Greek* (FF1KG) initiative of the *Open Greek and Latin* (OGL) project. Figure 4.40 shows the example of the detection of fragment 2 of the Βοιωτιακά of Leo Byzantius (FHG II 330), which is extracted from the *De fluviis* of Pseudo-Plutarchus (2.2).[261]

In its current state, text reuse detection in the DFHG project includes editions of ancient Greek sources and not of Latin sources, which can be in any case detected by inserting the URL of an XML file of the requested Latin text. Figure 4.41 shows the example of the detection of fragment 27 of the Περσικά of Dino (FHG II 94), which is extracted from the *Vita Cononis* of Cornelius Nepos (5) and which has been obtained by inserting the URL of the XML version of the Teubner edition (1886) of the *Vita Cononis* from the *Perseus Digital Library*: `phi0588.abo009.perseus-lat2.xml`.[262]

Text reuse in the DFHG is performed on the following 158 editions of ancient Greek sources:

– Aelian – *De Natura Animalium* [tlg0545.tlg001.perseus–grc1] (PERSEUS)
– Aelian – *Varia Historia* [tlg0545.tlg002.perseus–grc1] (PERSEUS)
– Agathemerus – *Geographiae Informatio* [tlg0090.tlg001.opp–grc1] (PERSEUS)
– Agathemerus – *Geographiae Informatio* [tlg0090.tlg001.opp–lat1] (PERSEUS)

– Agathias Scholasticus – *Historiae* [tlg4024.tlg001.opp–grc2.xml] (OGL)
– Agathias Scholasticus – *Historiae* [tlg4024.tlg001.opp–lat1.xml] (OGL)
– Alexander of Aphrodisias – *In Aristotelis metaphysica commentaria* [tlg0732.tlg004.opp–grc1.xml] (OGL)
– Ammonius Grammaticus – *De*

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260 For a discussion about the correction of the name, which is important for the identification of the author mentioned by Plutarch, see Pearson (1960) 70–72, BNJ 128 F 8, and BNJ 334 F 26. Karl Müller publishes the fragments of Polycleitus of Larissa and of Polycritus of Mende in one section of the *Scriptores Rerum Alexandri Magni* (129–133), where he suggests the correction of Πολύκριτος with Πολύκλειτος in Plut., *Alex.* 46 (129 and 132 fr. 6).

261 In this case the OGL edition of the *De fluviis* is from the *Geographi Graeci Minores* of Karl Müller (II 637–665): `tlg0094.tlg001.1st1K-grc1.xml`.

262 https://github.com/PerseusDL/canonical-latinLit/blob/master/data/phi0588/abo009/phi0 588.abo009.perseus-lat2.xml

adfinium vocabulorum differentia
[tlg0708.tlg001.1st1K–grc1.xml] (OGL)
– Apollodorus – *Library*
[tlg0548.tlg001.perseus–grc2] (PERSEUS)
– Apollonius Rhodius – *Argonautica*
[tlg0001.tlg001.perseus–grc2] (PERSEUS)
– Appian – *Mithridatic Wars*
[tlg0551.tlg014.perseus–grc2] (PERSEUS)
– Aristides, Aelius – *Orationes 13*
[tlg0284.tlg013.perseus–grc1] (PERSEUS)
– Aristides, Aelius – *Orationes 46*
[tlg0284.tlg046.perseus–grc1] (PERSEUS)
– Aristides, Aelius – *Orationes 48*
[tlg0284.tlg048.perseus–grc1] (PERSEUS)
– Aristotle – *Historia animalium*
[tlg0086.tlg014.1st1K–grc1.xml] (OGL)
– Aristotle – *Meteorologica*
[tlg0086.tlg026.1st1K–grc1.xml] (OGL)
– Aristotle – *Meteorologica*
[tlg0086.tlg026.1st1K–grc2.xml] (OGL)
– Aristotle – *Politics* (Greek)
[tlg0086.tlg035.perseus–grc1] (PERSEUS)
– Arrian – *Anabasis* [tlg0074.tlg001.perseus–
grc1] (PERSEUS)
– Arrian – *Indica* [tlg0074.tlg002.perseus–
grc1] (PERSEUS)
– Athenaeus – *Deipnosophistae*
[tlg0008.tlg001.perseus–grc3] (PERSEUS)
– Athenaeus – *The Deipnosophists*
[tlg0008.tlg001.perseus–grc4] (PERSEUS)
– Cassius Dio Cocceianus – *Historiae Ro-
manae* [tlg0385.tlg001.perseus–grc1]
(PERSEUS)
– Certamen Homeri et Hesiodi – *Certamen
Homeri et Hesiodi* [tlg1252.tlg002.1st1K–
grc1.xml] (OGL)
– Clement of Alexandria – *Protrepticus*
[tlg0555.tlg001.opp–grc1.xml] (OGL)
– Clement of Alexandria – *Protrepticus*
[tlg0555.tlg001.perseus–grc1] (PERSEUS)
– Diodorus Siculus – *Bibliotheca Historica,
Books I-V* [tlg0060.tlg001.perseus–grc1]
(PERSEUS)
– Diodorus Siculus – *Bibliotheca Historica,
Books XVIII-XX* [tlg0060.tlg001.perseus–
grc2] (PERSEUS)
– Diodorus Siculus – *Library* (Greek)
[tlg0060.tlg001.perseus–grc3] (PERSEUS)
– Diogenes Laertius – *Lives of Eminent
Philosophers* [tlg0004.tlg001.perseus–grc1]
(PERSEUS)

– Dionysius of Byzantium – *De Bospori Nav-
igatione* [tlg0083.tlg003.1st1K–grc1.xml]
(OGL)
– Dionysius of Halicarnassus – *An-
tiquitates Romanae, Books I-XX*
[tlg0081.tlg001.perseus–grc1] (PERSEUS)
– Dionysius of Halicarnassus – *De Dinarcho*
[tlg0081.tlg009.perseus–grc1] (PERSEUS)
– Dionysius of Halicarnassus – *De Isaeo*
[tlg0081.tlg005.perseus–grc1] (PERSEUS)
– Dionysius of Halicarnassus – *De Lysia*
[tlg0081.tlg003.perseus–grc1] (PERSEUS)
– Dionysius of Halicarnassus – *De Thucydide*
[tlg0081.tlg010.perseus–grc1] (PERSEUS)
– Dionysius of Halicarnassus –
Epistula ad Pompeium Geminum
[tlg0081.tlg015.perseus–grc1] (PERSEUS)
– Epictetus – *Discourses*
[tlg0557.tlg001.perseus–grc1] (PERSEUS)
– Eunapius – *Vitae Sophistarum*
[tlg2050.tlg001.opp–grc1.xml] (OGL)
– Eusebius – *Historia Ecclesiastica*
[tlg2018.tlg002.opp–grc2.xml] (OGL)
– Eusebius – *Historia Ecclesiastica*
[tlg2018.tlg002.opp–grc3.xml] (OGL)
– Eusebius – *Praeperatio Evangelica*
[tlg2018.tlg001.opp–grc1.xml] (OGL)
– Eusebius of Caesarea – *Historia eccle-
siastica* [tlg2018.tlg002.perseus–grc1]
(PERSEUS)
– Eutropius – *Breviarium historiae romanae*
[stoa0121.stoa001.opp–grc1.xml] (OGL)
– Greek Anthology – *Greek Anthology,
Volume I* [tlg7000.tlg001.perseus–grc1]
(PERSEUS)
– Greek Anthology – *Greek Anthology,
Volume II* [tlg7000.tlg001.perseus–grc2]
(PERSEUS)
– Greek Anthology – *Greek Anthology, Vol-
ume III* [tlg7000.tlg001.perseus–grc3]
(PERSEUS)
– Greek Anthology – *Greek Anthology, Vol-
ume IV* [tlg7000.tlg001.perseus–grc4]
(PERSEUS)
– Greek Anthology – *Greek Anthology,
Volume V* [tlg7000.tlg001.perseus–grc5]
(PERSEUS)
– Harpocration, Valerius – *Lexicon in decem
oratores Atticos* [tlg1389.tlg001.perseus–
grc2] (PERSEUS)
– Herodotus – *The Histories*

[tlg0016.tlg001.perseus–grc2] (PERSEUS)
– Josephus, Flavius – *Antiquitates Judaicae*
  [tlg0526.tlg001.perseus–grc1] (PERSEUS)
– Josephus, Flavius – *Contra Apionem*
  [tlg0526.tlg003.perseus–grc1] (PERSEUS)
– Julian, Emperor of Rome – *Misopogon*
  [tlg2003.tlg012.perseus–grc1] (PERSEUS)
– Longinus – *De Sublimitate*
  [tlg0560.tlg001.perseus–grc1] (PERSEUS)
– Lucian – *De parasito sive artem esse par-
  asiticam* [tlg0062.tlg030.perseus–grc1]
  (PERSEUS)
– Lucian – *Macrobii* [tlg0062.tlg011.perseus–
  grc1] (PERSEUS)
– Lucian – *Quomodo historia conscribenda sit*
  [tlg0062.tlg053.perseus–grc1] (PERSEUS)
– Lucian of Samosata – *Macrobii*
  [tlg0062.tlg011.1st1K–grc1.xml] (OGL)
– Lucianus Samosatenus – *De par-
  asito sive artem esse parasiticam*
  [tlg0062.tlg030.1st1K–grc1.xml] (OGL)
– Parthenius of Nicaea – *Narrationes Am-
  atoriae* [tlg0655.tlg001.perseus–grc1]
  (PERSEUS)
– Pausanias – *Description of Greece* (Greek)
  [tlg0525.tlg001.perseus–grc2] (PERSEUS)
– Philostratus – *Vitae Sophistarum*
  [tlg0638.tlg003.perseus–grc1] (PERSEUS)
– Plato – *Symposium*
  [tlg0059.tlg011.perseus–grc2] (PERSEUS)
– Plutarch – *Adversus Colotem*
  [tlg0007.tlg140.perseus–grc1] (PERSEUS)
– Plutarch – *Aemilius Paulus*
  [tlg0007.tlg019.perseus–grc2] (PERSEUS)
– Plutarch – *Agis* [tlg0007.tlg051a.perseus–
  grc1] (PERSEUS)
– Plutarch – *Alcibiades*
  [tlg0007.tlg015.perseus–grc2] (PERSEUS)
– Plutarch – *Alexander*
  [tlg0007.tlg047.perseus–grc1] (PERSEUS)
– Plutarch – *Alexander*
  [tlg0007.tlg047.perseus–grc2] (PERSEUS)
– Plutarch – *Amatorius*
  [tlg0007.tlg113.perseus–grc1] (PERSEUS)
– Plutarch – *An seni respublica gerenda sit*
  [tlg0007.tlg117.perseus–grc1] (PERSEUS)
– Plutarch – *Antony*
  [tlg0007.tlg058.perseus–grc1] (PERSEUS)
– Plutarch – *Aratus* [tlg0007.tlg063.perseus–
  grc1] (PERSEUS)
– Plutarch – *Aristides*

[tlg0007.tlg024.perseus–grc1] (PERSEUS)
– Plutarch – *Artaxerxes*
  [tlg0007.tlg064.perseus–grc1] (PERSEUS)
– Plutarch – *Brutus* [tlg0007.tlg061.perseus–
  grc1] (PERSEUS)
– Plutarch – *Caesar* [tlg0007.tlg048.perseus–
  grc1] (PERSEUS)
– Plutarch – *Caius Marius*
  [tlg0007.tlg031.perseus–grc1] (PERSEUS)
– Plutarch – *Camillus*
  [tlg0007.tlg011.perseus–grc2] (PERSEUS)
– Plutarch – *Cimon* [tlg0007.tlg035.perseus–
  grc1] (PERSEUS)
– Plutarch – *Cleomenes*
  [tlg0007.tlg051b.perseus–grc1] (PERSEUS)
– Plutarch – *Comparison of Pelopidas and
  Marcellus* [tlg0007.tlg023.perseus–grc1]
  (PERSEUS)
– Plutarch – *Comparison of Solon and
  Publicola* [tlg0007.tlg009.perseus–grc2]
  (PERSEUS)
– Plutarch – *Comparison of Timoleon and
  Aemilius* [tlg0007.tlg020.perseus–grc2]
  (PERSEUS)
– Plutarch – *De Alexandri magni fortuna
  aut virtute* [tlg0007.tlg087.perseus–grc1]
  (PERSEUS)
– Plutarch – *De Alexandri magni fortuna
  aut virtute* [tlg0007.tlg087.perseus–grc2]
  (PERSEUS)
– Plutarch – *De animae procreatione in
  Timaeo* [tlg0007.tlg134.perseus–grc1]
  (PERSEUS)
– Plutarch – *De cohibenda ira*
  [tlg0007.tlg095.perseus–grc1] (PERSEUS)
– Plutarch – *De defectu oraculorum*
  [tlg0007.tlg092.perseus–grc1] (PERSEUS)
– Plutarch – *De defectu oraculorum*
  [tlg0007.tlg092.perseus–grc2] (PERSEUS)
– Plutarch – *De E apud Delphos*
  [tlg0007.tlg090.perseus–grc1] (PERSEUS)
– Plutarch – *De faciae quae in orbe lunae
  apparet* [tlg0007.tlg126.perseus–grc1]
  (PERSEUS)
– Plutarch – *De fortuna Romanorum*
  [tlg0007.tlg086.perseus–grc1] (PERSEUS)
– Plutarch – *De fortuna Romanorum*
  [tlg0007.tlg086.perseus–grc2] (PERSEUS)
– Plutarch – *De garrulitate*
  [tlg0007.tlg101.perseus–grc1] (PERSEUS)
– Plutarch – *De Herodoti malignitate*

[tlg0007.tlg123.perseus–grc1] (PERSEUS)
- Plutarch – *De Iside et Osiride* [tlg0007.tlg089.perseus–grc1] (PERSEUS)
- Plutarch – *De Pythiae oraculis* [tlg0007.tlg091.perseus–grc1] (PERSEUS)
- Plutarch – *De sollertia animalium* [tlg0007.tlg129.perseus–grc1] (PERSEUS)
- Plutarch – *Demetrius* [tlg0007.tlg057.perseus–grc1] (PERSEUS)
- Plutarch – *Dion* [tlg0007.tlg060.perseus–grc1] (PERSEUS)
- Plutarch – *Eumenes* [tlg0007.tlg041.perseus–grc1] (PERSEUS)
- Plutarch – *Fabius Maximus* [tlg0007.tlg013.perseus–grc2] (PERSEUS)
- Plutarch – *Lucullus* [tlg0007.tlg036.perseus–grc1] (PERSEUS)
- Plutarch – *Lycurgus* [tlg0007.tlg004.perseus–grc2] (PERSEUS)
- Plutarch – *Lysander* [tlg0007.tlg032.perseus–grc1] (PERSEUS)
- Plutarch – *Marcellus* [tlg0007.tlg022.perseus–grc1] (PERSEUS)
- Plutarch – *Maxime cum principibus philosopho esse diserendum* [tlg0007.tlg115.perseus–grc1] (PERSEUS)
- Plutarch – *Mulierum virtutes* [tlg0007.tlg083.perseus–grc1] (PERSEUS)
- Plutarch – *Mulierum virtutes* [tlg0007.tlg083.perseus–grc2] (PERSEUS)
- Plutarch – *Nicias* [tlg0007.tlg038.perseus–grc1] (PERSEUS)
- Plutarch – *Non posse suaviter vivi secundum Epicurum* [tlg0007.tlg139.perseus–grc1] (PERSEUS)
- Plutarch – *Numa* [tlg0007.tlg005.perseus–grc2] (PERSEUS)
- Plutarch – *Parallela minora* [tlg0007.tlg085.perseus–grc1] (PERSEUS)
- Plutarch – *Parallela minora* [tlg0007.tlg085.perseus–grc2] (PERSEUS)
- Plutarch – *Pelopidas* [tlg0007.tlg021.perseus–grc2] (PERSEUS)
- Plutarch – *Philopoemen* [tlg0007.tlg027.perseus–grc1] (PERSEUS)
- Plutarch – *Phocion* [tlg0007.tlg049.perseus–grc1] (PERSEUS)
- Plutarch – *Pompey* [tlg0007.tlg045.perseus–grc1] (PERSEUS)
- Plutarch – *Publicola* [tlg0007.tlg008.perseus–grc2] (PERSEUS)
- Plutarch – *Pyrrhus* [tlg0007.tlg030.perseus–grc1] (PERSEUS)
- Plutarch – *Quaestiones Convivales* [tlg0007.tlg112.perseus–grc1] (PERSEUS)
- Plutarch – *Quaestiones Graecae* [tlg0007.tlg084b.perseus–grc1] (PERSEUS)
- Plutarch – *Quaestiones Graecae* [tlg0007.tlg084b.perseus–grc2] (PERSEUS)
- Plutarch – *Quaestiones Romanae* [tlg0007.tlg084a.perseus–grc1] (PERSEUS)
- Plutarch – *Quaestiones Romanae* [tlg0007.tlg084a.perseus–grc2] (PERSEUS)
- Plutarch – *Regum et imperatorum apophthegmata* [tlg0007.tlg081.perseus–grc1] (PERSEUS)
- Plutarch – *Regum et imperatorum apophthegmata* [tlg0007.tlg081.perseus–grc2] (PERSEUS)
- Plutarch – *Romulus* [tlg0007.tlg002.perseus–grc2] (PERSEUS)
- Plutarch – *Septem sapientium convivium* [tlg0007.tlg079.perseus–grc1] (PERSEUS)
- Plutarch – *Sertorius* [tlg0007.tlg042.perseus–grc1] (PERSEUS)
- Plutarch – *Solon* [tlg0007.tlg007.perseus–grc2] (PERSEUS)
- Plutarch – *Sulla* [tlg0007.tlg033.perseus–grc1] (PERSEUS)
- Plutarch – *Themistocles* [tlg0007.tlg010.perseus–grc2] (PERSEUS)
- Plutarch – *Theseus* [tlg0007.tlg001.perseus–grc2] (PERSEUS)
- Plutarch – *Timoleon* [tlg0007.tlg018.perseus–grc2] (PERSEUS)
- Plutarch – *Vitae decem oratorum* [tlg0007.tlg121.perseus–grc1] (PERSEUS)
- Polyaenus – *Strategemata* [tlg0616.tlg001.1st1K–grc1.xml] (OGL)
- Polybius – *Histories* [tlg0543.tlg001.perseus–grc2] (PERSEUS)
- Porphyrius – *De abstinentia* [tlg2034.tlg003.1st1K–grc1.xml] (OGL)
- Porphyrius – *Vita Pythagorae* [tlg2034.tlg002.1st1K–grc1.xml] (OGL)
- Porphyry – *Quaestionum Homericanum ad Iliadem pertinentium reliquiae* [tlg2034.tlg014.1st1K–grc1.xml] (OGL)
- Procopius – *de Bellis* [tlg4029.tlg001.perseus–grc1] (PERSEUS)
- Procopius – *Historia Arcana (Anecdota)* [tlg4029.tlg002.perseus–grc1] (PERSEUS)

– Pseudo-Arrianus – *Anonymi (Arriani, ut fertur) periplus ponti Euxini* [tlg0075.tlg001.1st1K–grc1.xml] (OGL)
– Pseudo-Plutarch – *De Fluviis* [tlg0094.tlg001.1st1K–grc1.xml] (OGL)
– Pseudo-Plutarch – *De musica* [tlg0094.tlg002.perseus–grc1] (PERSEUS)
– Pseudo-Plutarch – *Placita Philosophorum* [tlg0094.tlg003.perseus–grc1] (PERSEUS)
– Pseudo-Scymnus – *Scymni Chii, ut fertur, Periegesis* [tlg0068.tlg001.1st1K–grc1.xml] (OGL)
– Sextus Empiricus – *Adversus mathematicos* [tlg0544.tlg002.opp–grc1.xml] (OGL)
– Sextus Empiricus – *Pyrrhoniae hypotyposes* [tlg0544.tlg001.opp–grc1.xml] (OGL)
– Sextus Empiricus – *Pyrrhoniae hypotyposes* [tlg0544.tlg001.opp–lat1.xml] (OGL)
– Strabo – *Geography* (Greek) [tlg0099.tlg001.perseus–grc1] (PERSEUS)
– Strabo – *Strabonis Geographiae Chrestomathia* [tlg0099.tlg001.1st1K–grc1.xml] (OGL)
– Themistius – *In libros Aristotelis de Anima paraphrasis* [tlg2001.tlg040.opp–grc1.xml] (OGL)
– Theophrastus – *Enquiry into Plants* [tlg0093.tlg001.1st1K–grc1.xml] (OGL)
– Zosimus – *Historia Nova* [tlg4084.tlg001.opp–grc1.xml] (OGL)

This list with links is available at http://www.dfhg-project.org/text_reuse_detection/Witnesses_vs_Digital_Libraries.php. The list distinguishes between texts from the *Perseus Digital Library* (PERSEUS) and texts from the *Free First Thousand Years of Greek* (OGL).[263] Links to these editions and their metadata have been semi-automatically extracted from the GitHub repositories of the *Perseus Digital Library* and of the *Free First Thousand Years of Greek*, because it is not possible to completely automatize the process. For this reason and also considering the fact that both projects are ongoing and still have to add many other editions of Classical sources, the DFHG project will progressively add — as soon as available — other witness sources to be analyzed as part of text reuse detection. As for now, the aim is to show complexities and needs that help implement a model for detecting text reuses of fragmentary authors in modern philological editions.

A problem is represented by the fact that parts of *Perseus* URNs that refer to editions are not stable. This means that links to *Perseus* XML files currently provided by the DFHG project may not work. For example, when the text reuse detection functionality was released in 2018, the edition of Plutarch's *Alexander* by Perrin was accessible in the GitHub repository of the *Perseus Digital Library* as `tlg0007.tlg047.perseus-grc1`.[264] This same XML file is currently accessible as `tlg0007.tlg047.perseus-grc2` and not anymore as `tlg0007.tlg047.perseus-grc1`.[265] In order to keep track of the current state of *Perseus* identifiers, the DFHG project provides a message in the case that *Perseus* URNs are not available.

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263 For more information on these editions and their URNs, see the *Perseus Catalog*.
264 This is the URN still present in the *Perseus Catalog*: http://data.perseus.org/catalog/urn:cts:greekLit:tlg0007.tlg047.perseus-grc1.
265 https://github.com/PerseusDL/canonical-greekLit/tree/master/data/tlg0007/tlg047.

Figure 4.42 shows the example of the edition of Perrin, where users are informed that `tlg0007.tlg047.perseus-grc1` is currently not available. The DFHG project provides also a web page with the 158 editions listed in the previous pages that shows how many of them are not anymore accessible.[266]
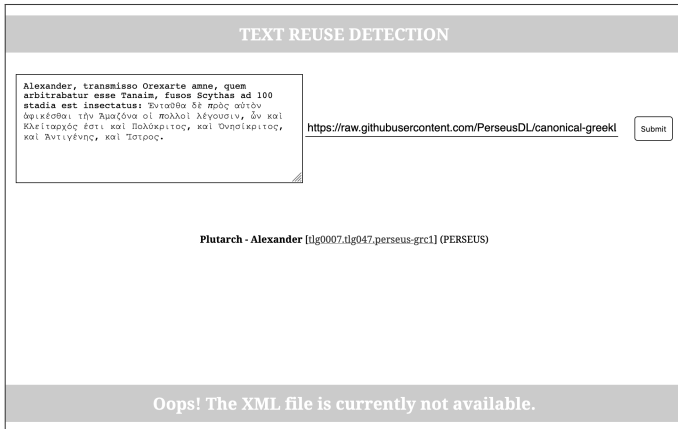
Figure 4.42. DFHG *Text Reuse Detection*: error message

Another *desideratum* of the current state of research is to provide more digital editions of Classical sources, which is particularly relevant in the case of historical fragments because they are preserved by texts that still need to be digitized. In order to check how many editions of witness sources are still missing in the *Perseus Digital Library* and in the *Free First Thousand Years of Greek*, the DFHG project provides a *Witnesses Catalog – Text Reuse Detection* tool.[267] This resource *aligns* the *Witnesses Catalog* of the DFHG with the list of the above mentioned 158 editions that have been collected for text reuse detection. By searching an FHG `author`, a `witness author`, or a `witness work`, it is possible to see how many editions are currently available. For example, if we search the FHG `author` Ister, it is possible to get a list of his FHG witnesses that are currently available in a digital format for text reuse detection (fig. 4.43). If we choose one of the available editions (e.g., Harpocration, Valerius – *Lexicon in decem oratores Atticos* – `tlg1389.tlg001.perseus-grc2`), the system automatically detects all the fragments of Ister in the selected edition (fig. 4.44).[268]

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266 See http://www.dfhg-project.org/text_reuse_detection/Witnesses_vs_Digital_Libraries_c heck.php. Red entries are currently not available.

267 http://www.dfhg-project.org/text_reuse_detection/xml_catalog_alignment.php

268 In this case it is the edition of the *Lexicon* of Harpocration by Wilhelm Dindorf (1853). If a link to a *Perseus* XML file doesn't work, an error message informs users who are invited to check the current version of the file identifier in the *Perseus Digital Library* GitHub repository.

Figure 4.43. DFHG *Witnesses Catalog*: text reuse detection (Ister)

Figure 4.44. DFHG *Witnesses Catalog*: text reuse detection (Ister in Valerius Harpocration)

The DFHG offers also an integration with the *Digital Athenaeus* project. As described at p. 228 and when the witness work is the *Deipnosophists* of Athenaeus, the DFHG *Witnesses Catalog* includes not only the icon 🧩 but also the acronym **DA**, which stands for *Digital Athenaeus* (fig. 4.25). By clicking **DA**, it is possible to visualize the requested fragment within the text of the *Deipnosophists* published in the *Digital Athenaeus*.[269] For example, if we search Phanodemus in the *Witnesses Catalog* and we select fragment 1, by clicking **DA** a new window of the *Digital Athenaeus* project opens where we can visualize a yellow highlighted portion of a paragraph of the *Deipnosophists* (9.47) that corresponds to the text extracted by Karl Müller and published as fr. 1 of Phanodemus (fig. 4.45).[270]

Finally, the DFHG project provides an experimental alignment of the DFHG *Witnesses Catalog* with the entire corpus of the 158 XML files of the *Perseus Digital Library* and the *Free First Thousand Years of Greek*: http://www.dfhg-project.org/text_reuse_detection/xml_catalog_corpus_alignment.php. In this case, text reuse detection can be performed on the entire corpus by searching an FHG `author`, a `witness author`, and a `witness work` (e.g., Plutarchus [`witness author`]).[271]

4.4.6 Thesaurus and Named Entity Recognition

As described in section 4.3.4, one of the main goals of the DFHG project is to integrate the *Fragmenta Historicorum Graecorum* with external resources such as textual collections, authority lists, indices, dictionaries, lexica and gazetteers. As part of this goal, the DFHG aims at creating a complete Thesaurus of ancient Greek texts of the FHG and perform Named Entity Recognition (NER).[272]

📑 Thesaurus. The FHG is a complex philological edition with many different elements that are expressed in three languages: Greek, Latin, and French.[273] Greek is the language of most of the fragments, Latin is the language of a smaller portion of fragments, academic Latin and French are the languages of translations and commentaries. Thanks to the creation of a textual database, the DFHG project can extract texts of the ancient sources published in the FHG. In terms of data, the entire DFHG is constituted by a total of 2,315,700 tokens with 337,833 unique forms. The DFHG database field `text` contains a total of 730,384 tokens

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269 See section 5.3.1.

270 The text of the *Deipnosophists* in the *Digital Athenaeus* is based on the Teubner edition of Georg Kaibel: see section 5.3.

271 http://www.dfhg-project.org/text_reuse_detection/xml_catalog_corpus_alignment.php?what[]=witness_author|Plutarchus&onoffswitch=on

272 On NER of historical documents, see pp. 398 ff.

273 On the structure of the FHG, see section 4.3.1.

Figure 4.45. *Digital Athenaeus*: text reuse detection
(Ath., *Deipn.* 9.47 = Phanodemus, FHG I fr. 1)

with 115,199 unique forms.[274] If we select the type `fragment` for the databse field `text`, we have a total of 684,977 ancient Greek tokens with 91,754 unique forms, of which 56,553 forms have been lemmatized with 12,928 lemmata. The goal of the FHG is to extract ancient Greek tokens from the field `text` (type `fragment` and `extant text`) and build a Thesaurus. Ancient Greek fragmentary historiography collects quotations and text reuses of lost historical texts that covered many different aspects of local traditions and antiquities, and therefore fragments preserve a rich vocabulary that is usually not contained in dictionaries. This is the reason why these fragments are an important resource to expand and improve digital lexica and dictionaries. Every source in the DFHG database field `text` has been tokenized in order to produce stable URNs of each word and to lemmatize each inflected form through *Morpheus*. Ancient Greek lemmata are used to interrogate external resources like the *Suda On Line* and the *Liddel-Scott Lexicon in the CITE Architecture*.[275] One of the purposes of producing a thesaurus is for detecting Named Entities (NEs) in the fragments, by which we mean proper names such as personal names, work titles, and geographical names.

🔒 Named Entity Recognition. In this regard, the DFHG project is working on named entities recognition and on the creation of a complete DFHG thesaurus by including other external authority lists. Figure 4.46 shows an example with some of the DFHG occurrences of the Greek word Εὐρώπη, which is both a personal and a place name. The lemmatization of the inflected forms automatically identifies the word both in the *Lexicon of Greek Personal Names* (LGPN) and in *Pleiades*. A further work of analysis of the contexts of the DFHG fragments, where this word appears, provides an overview of the use of Εὐρώπη in Greek historiography both as a personal and a place name.[276]

Εὐρώπη [Europe] - 👤*personal name* in LGPN - 📍*place* in Pleiades
Εὐρώπην [Europen] 🔍
   urn:lofts:fhg.4.joannes_antiochenus.joannis_antiocheni_fragmenta.historia_chronica:6@εὐρώπην[3] 📄 📄
   urn:lofts:fhg.2.andron_halicarnassensis.andronis_halicarnassensis_fragmenta.cognationes_historiae:1@εὐρώπην[1] 📄 📄
   urn:lofts:fhg.5-1.dionysius_byzantius.anaplus_bospori:1.a@εὐρώπην[2] 📄 📄
   urn:lofts:fhg.3.agatharchides_cnidius.agatharchidis_cnidii_fragmenta.de_rebus_asiaticis.e_libro_secundo:15@εὐρώπην[1] 📄 📄
   urn:lofts:fhg.1.apollodorus_atheniensis.apollodori_atheniensis.bibliothecae.liber_secundus.caput_v:7.1@εὐρώπην[1] 📄 📄
   urn:lofts:fhg.3.porphyrius_tyrius.porphyrii_tyrii_fragmenta.reges_macedonum:1@εὐρώπην[1] 📄 📄
   urn:lofts:fhg.5-1.critobulus.de_rebus_gestis_mechemetis_ii.critobuli_historiarum_liber_i:xvi@εὐρώπην[1] 📄 📄
   urn:lofts:fhg.5-1.dionysius_byzantius.anaplus_bospori:1.a@εὐρώπην[3] 📄 📄
   urn:lofts:fhg.2.megasthenes.megasthenis_fragmenta.epitome_indicorum.e_libro_primo:2@εὐρώπην[1] 📄 📄
   urn:lofts:fhg.1.timaeus.timaei_fragmenta.historiai.italica_et_sicula.liber_primus:24@εὐρώπην[1] 📄 📄
   urn:lofts:fhg.5-1.critobulus.de_rebus_gestis_mechemetis_ii.critobuli_historiarum_liber_ii:xiii@εὐρώπην[1] 📄 📄
   urn:lofts:fhg.2.dionysius_mytilenaeus.dionysii_mytilenaei_fragmenta.argonautica.e_libro_secundo:9@εὐρώπην[1] 📄 📄
   urn:lofts:fhg.1.acusilaus.acusilai_fragmenta.genealogiae:20@εὐρώπην[1] 📄 📄

Figure 4.46. Named Entity disambiguation in the DFHG

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274 On the content of the database field `text`, see p. 151.
275 On these resources, see section 4.3.4.
276 Berti (2019c) 265-266.

4.5 Digital Marmor Parium

As described at p. 129, the appendix of the first volume of the *Fragmenta Historicorum Graecorum* contains the editions of the Parian Marble and of the Greek text of the Rosetta Stone. The DFHG database includes not only both documents as part of the collection, but has also developed two independent projects: the *Digital Marmor Parium* and the *Digital Rosetta Stone*. The goal of these two projects is to analyze and represent both inscriptions in a digital environment. The *Digital Marmor Parium* provides not only images and drawings of the stone, but also digital data about named entities (geographical and personal names), chronological expressions, and linguistic information preserved by the text of the Parian Marble.[277]

The project concentrates on the following aspects: 1) character encoding of ancient Greek in epigraphical texts with a focus on Attic acrophonic numerals; 2) contribution to the EpiDoc Guidelines for the inclusion of further elements and characteristics of ancient Greek inscriptions to be encoded in XML; 3) digital representation of ancient Greek chronological data; 4) Named Entity Recognition and Annotation of ancient Greek personal and geographical names; 5) linguistic annotation of epigraphical texts in ancient Greek; 6) reading and description of images of the Parian Marble.

The following sections describe the inscription of the *Marmor Parium* and data produced by the *Digital Marmor Parium* project according to the following topics: 1) EpiDoc XML encoding of the *Marmor Parium* (4.5.2), 2) the geography of the *Marmor Parium* (4.5.3), 3) onomastics and prosopography of the *Marmor Parium* (4.5.4), 4) the chronology of the *Marmor Parium* (4.5.5), 5) linguistics of the *Marmor Parium* (4.5.6), and 6) images of the *Marmor Parium* (4.5.7 and 4.5.8).

4.5.1 The Marmor Parium

The Parian Marble (IG XII 5, 444) survives in two fragments:[278]
   – Fragment A (ll. 1–93). This fragment arrived at the palace of the Earl of Arundel in London in 1627 after being probably purchased in Smyrna. The upper part (ll. 1–45: fig. 4.47) is now lost and known thanks to the transcription published by John Selden in the *Marmora Arundelliana* (London 1628–1629: 1–14 and 59–119).

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277 The project is available at http://www.digitalmarmorparium.org. See Berti/Stoyanova (2014), Berti (2016c), and Berti/Almas et al. (2016).

278 For a recent and detailed description of the Parian Marble, of the discovery of its fragments, and of scholarship about them, see Rotstein (2016) 1–15.

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. . . . . Ο Υ . . . . . . . . . . . . . . ΝΡΑΝ . . . ΩΝ . . . . . . . . . . ΝΩΝΑΝΕΓΡΑΨΑΤΟΥΣΑΝ . . . .
. . . . . . Α Ρ Σ Α Μ . . . Ο Σ Α Ρ Ο Κ Ε Κ Ρ Ο Π Ο Σ Τ Ο Υ Π Ρ Α Τ Ο Υ Β Α Σ Ι Λ Ε Υ Σ Α Ν Τ Ο Σ Α Θ Η Ν Α Ν Ε Ι Α Σ Α Ρ Χ Ο Ν Τ Ο Σ Ε Μ Π Α Ρ Ω Ι . . .
. . . Υ Α Ν Α Κ Τ Ο Σ Α Θ Η Ν Η Σ Ι Ν Α Δ Ε Δ Ι Ο Γ Ν Η Τ Ο Υ        Α Φ Ο Υ Κ Ε Ρ Ο Ψ Α Θ Η Ν Ω Ν Ε Β Α Σ Ι Λ Ε Υ Σ Ε Κ Α Ι Η Χ Ω Ρ Α Ν Ε Κ Ρ Ο Π Ι Α Ε Κ Λ Η Θ Η Τ Ο Π Ρ Ο Τ Ε Ρ Ο Ν Κ Α Λ Ο Υ
Μ Ε Ν Η Α Κ Τ Ι Κ Η Α Ρ Ο Α Κ Τ Α Ι Ο Υ Τ Ο Υ Α Υ Τ Ο Χ Θ Ο Ν Ο Σ Ε Τ Η Χ Η Η Η Δ Ρ Π Ι Ι Α Φ Ο Υ Δ Ε Υ Κ Α Λ Ι Ω Ν Π Α Ρ Α Τ Ο Ν Π Α Ρ Ν Α Σ Σ Ο Ν Ε Ν Α Υ Κ Ο Ρ Ε Ι Α Ι Ε Β Α Σ Ι Λ Ε Υ Σ Ε . . Σ Ι Λ Ε . .
. . Ν Τ Ο Σ Α Θ Η Ν Α Ν Ε Κ Ε Κ Ρ Ο Π Ο Σ Ε Τ Η Χ Η Η Η Δ Α Φ Ο Υ Δ Ι Κ Η Α Θ Η Ν Η Σ Ι . . . Ν Ε Τ Ο Α Ρ Ε Ι Κ Α Ι Π Ο Σ Ε Ι Δ Α Ν Ι Υ Π Ε Ρ Α Λ Ι Ρ Ρ Ο Θ Ι Ο Υ Τ Ο Υ Π Ο Σ Ε Ι Δ Α Ν Ο Σ Κ Α Ι Ο Τ Ο Π Ο Σ Ε Κ Λ Η Θ Η
Α Ρ Ε Ι Ο Σ Π Α Γ Ο Σ Ε Τ Η Χ Η Η Δ Ρ Π Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Κ Ρ . . . Ο Υ Α Φ Ο Υ Κ Α Τ Α Κ Λ Υ Σ Μ Ο Σ Ε Π Ι Δ Ε Υ Κ Α Λ Ι Ω Ν Ο Σ Ε Γ Ε Ν Ε Τ Ο Κ Α Ι Δ Ε Υ Κ Α Λ Ι Ω Ν Τ Ο Υ Σ
Ο Μ Β Ρ Ο Υ Σ Ε Φ Υ Γ Ε Ν Ε Γ Λ Υ Κ Α Ρ Ε Ι Α Σ Ε Ι Σ Α Θ Η Ν Α Σ Π Ρ Ο . . . Ο Ν Κ Α Ι Τ Ο Υ Δ Ι Ο . . Υ Ο . . . Δ . . . Μ Τ Ο Υ Τ Ο Ι Ρ . . Ο Ν Ι Δ . . . . . . Ο . . Τ Α Σ Ω Τ Η Ρ Ι Α Ε Θ Υ Σ Ε Ν
. . Τ Η Χ Η Η Δ Ρ Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Κ Ρ . Ν . . Ο Υ Α . . . . . Κ Τ Υ Σ Α Δ Ε Υ Κ Α Λ Ι Ω Ν Ο Σ Ε Β Α Σ Ι Λ Ε Υ Σ Ε Ν Ε Ν Ο Θ Ε Ρ Μ Ο Π Υ Λ Α Ι Σ Κ Α Ι Σ Υ Ν Η Γ Ε
. . Ο Υ Σ Π Ε Ρ Ι Τ Ο Ν Ο Ρ Ο Ν Ο Ι Κ Ο Υ Ν Τ Α Σ Κ Α Ι Ω . . Μ Α Σ Ε Ν Α Μ Φ Ι Κ Τ Υ Ο Ν Α Σ Κ Α Ι Ρ . . . . . Ν Ο Υ . Κ Α Ι Ν Η Ν Ε Τ Ι Θ Υ Ο Υ Σ Ι Ν Α Μ Φ Ι Κ Τ Υ Ο Ν Ε Σ
. . Τ Η Χ Η Η Δ Ρ Π Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Α Μ Φ Ι Κ Τ Υ Ο Ν Ο Σ Α Φ Ο Υ Ε Λ Λ Η Ν Ο Δ Ε Υ Κ . . . . . . . . . . π Τ Ι Δ Υ Σ Ε Β Α Σ Ι Λ Ε Υ Σ Ε Κ Α Ι Ε Λ Λ Η Ν Ε Σ
. . . Ο Μ Α Σ Θ Η Σ Α Ν Τ Ο Π Ρ Ο Τ Ε Ρ Ο Ν Γ Ρ Α Ι Κ Ο Ι Κ Α Λ Ο Υ Μ Ε Ν Ο Ι Κ Α Ι Τ Ο Ν Α Γ Ω Ν Α Π Α Ν Α Θ . . Ν Α Ι . . . . . . . Ω Ι Χ Η Η Ρ Π Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ
Α Θ Η Ν Α Ν Α Μ Φ Ι Κ Τ Υ Ο Ν Ο Σ Α Φ Ο Υ Κ Α Δ Μ Ο Σ Ο Α Γ Η Ν Ο Ρ Ο Σ Ε Ι Σ Θ Η Β Α Σ Α Φ Ι Κ Ε Τ Ο . . . . . . . . . . . . Ε Κ Τ Ι Σ Ε Ν Τ Η Ν Κ Α Δ Μ Ε Ι
Α Ν Ε Τ Η Χ Η Η Ρ Π Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Α Μ Φ Ι Κ Τ Υ Ο Ν Ο Σ Α Φ Ο Υ . . . . . . . . . . . . . Ν Ι Κ Η Σ Ε Β Α Σ Ι Λ Ε Υ Σ Α Ν
Ε Τ Η Χ Η Η Ρ Π Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Α Μ Φ Ι Κ Τ Υ Ο Ν Ο Σ Α Φ Ο Υ Ν Α Υ . . . . . . . . Η . . . . . . . . Ω Ν Ε Σ Α Ι Γ Υ Π Τ Ο Υ
. . Ι Σ Τ Η Ν Ε Λ Λ Α Δ Α Ε Ρ Λ Ε Υ Σ Ε Κ Α Ι Ω Ν Ο Μ Α Σ Θ Η Ρ Ε Ν Τ Η Κ Ο Ν Τ Ο Ρ Ο Σ Κ Α Ι Α Ι Δ Α Ν Α Ο Υ Ο Υ Γ Α Τ Ε Ρ Ε Σ . . . . . . . . Ω Ν Η Κ Α Ι Β Α . .
. . Λ Ρ Ε Υ Σ Κ Α Ι Ε Λ Ι Κ Η Κ Α Ι Α Ρ Χ Ε Δ Ι Κ Η Α Ρ Ο Κ Λ Η Ρ Ο Θ Ε Ι Σ Α Ι Υ Τ Ο Τ Ω Ν Λ Ω Ι Ρ Ω Ν . . . . . . . . . . . . . . Α Ν Τ . .
Κ Α Ι Ε Θ Υ Σ Α Ν Ε Ρ Ι Τ Η Σ Α Κ Τ Η Σ Ε Μ Π Α Ρ Α . . Δ Ι Ε Ν Α Ι Ν Α Δ Ι Π Η Ρ Ο Δ Ι Α Σ Ε Τ Η Χ Η Η Δ Δ Δ Ρ Π Ι Ι Β Α Σ Ι Λ Ε Υ Ο . . . . . . . . . . . . . . .
Θ Ο Ν Ι Ο Σ Π Α Ν Α Θ Η Ν Α Ι Ο Ι Σ Τ Ο Ι Σ Ρ Ρ Α Τ Ο Ι Σ Γ Ε Ν Ο Μ Ε Ν Ο Ι Σ Α Ρ Μ Α Ε Σ Ε Υ Σ Ε Κ Α Ι Τ Ο Ν Α Γ Ο Ν Α Ε Δ Ε Ι Κ Ν Υ Ε Κ Α Ι Α Θ Η Ν Α Ι Ο Υ Σ . . . Ο Ν . . . Α Ι . . .
. . Ε Ω Ν Μ Η Τ Ρ Ο Σ Ε Φ Α Ν Η Ε Γ Κ Υ Β Ε Λ Ο Ι Σ Κ Α Ι Γ Α Γ Ν Ι Σ Ο Φ Ρ Υ Σ Α Υ Ο Υ Σ Π Ρ Α Τ Ο Σ Η Υ Ρ Ε Ν Ε Γ Κ . . Α Ν Ν Α Ι . . . . . . Σ Φ Ρ . . . . . . . . . . .
Θ Υ Μ Ε Ν Η Ν Φ Ρ Υ Γ Ι Σ Τ Ι Π Ρ Α Τ Ο Σ Η Υ Λ Η Σ Ε Κ Α Ι Λ Λ Α Ο Υ Σ Ν Ο Μ Ο Υ Σ Μ Η Τ Ρ Ο Σ Δ Ι Ο Ν Υ Σ Ο Υ Π Α Ν Ο Σ Κ Α Ι Τ Ο Ν Ε Φ . . . . . . . . . . . . . .
. . . . . . Ε Τ Η Χ Η Η Δ Δ Δ Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Ε Ρ Ι Χ Θ Ο Ν Ι Ο Υ Τ Ο Υ Α Ρ Μ Α Σ Ε Υ Σ Α Ν Τ Ο Σ Α Φ Ο Υ Μ Ι Ν Ο Σ . . Ρ Ρ . . . Β Α . . . . . . .
Δ . . . . Α Ω Ν Ι Α Ν Ω Ι Κ Ι Σ Ε Κ Α Ι Σ Ι Δ Η Ρ Ο Σ Η Υ Ρ Ε Θ Η Ε Ν Τ Η Ι Ι Δ Η Ι Ε Υ Ρ Ο Ν Τ Α Ν Τ Α Ν Ι Α Ι Σ Ν Δ Α Κ Τ Υ Λ Ο Ι Σ Κ Α Λ Μ Ι Ο Σ Κ . . . . . .
. . Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Π Α Ν Δ Ι Ο Ν Ο Σ Α Φ Ο Υ Δ Η Μ Η Τ Η Ρ Α Φ Ι Κ Ο Μ Ε Ν Η Ε Ι Σ Α Θ Η Ν Α Σ Κ Α Ρ Π Ο Ν Ε Φ Υ . . Υ Ε Ν Κ Α Ι Ρ Ρ . . . Ρ Ρ Α . . . . . Θ Τ Η Δ . . . . .
. . Ρ Ι Ρ Τ Ο Λ Ε Μ Ο Υ Τ Ο Υ Κ Ε Λ Ε Ο Υ Κ Α Ι Ν Ε Α Ι Ρ Α Σ Ε Τ Η Χ Η Η Δ Δ Δ Δ Ρ Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Η Σ Ι Ν Ε Ρ Ι Χ Θ Ο Ε Σ Α Φ Ο Υ Τ Ρ Ι Π Τ Ο . . . . . . . . . .
. . . . . Ε Σ Π Ε Ι Ρ Ε Ν Ε Ν Τ Η Ι Ρ Α Ρ Ι Α Ι Κ Α Λ Ο Υ Μ Ε Ν Η Ι Ε Λ Ε Υ Σ Ι Ν Ι Ε Τ Η Χ . . Δ Δ Δ Δ Ρ Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν . . . . . .
Υ Ι Ο . . . Ν . . Α Υ Τ Ο Υ Π Ο Η Σ Ι Ν Ε Σ . . Θ Η Κ Ε Κ Ο Ρ Η Σ Τ Ε Α Ρ Π Α Γ Η Ν Κ Α Ι Δ Α Μ Η Τ Ρ Ο Σ Ζ Η Τ Η Σ Ι Ν Κ Α Ι Τ Ο Ν Α Υ Τ Ο Υ . . . . . . . . . . .
. . . . . . . Θ Ω Σ Τ Α Ν Υ Ρ Ο Δ Ε Σ Α Μ Ε Ν Α Ν Τ Ο Ν Κ Α Ρ Ρ Ο Ν Ε Τ Η Χ Η Δ Δ Δ Ρ Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Ε Ρ Ι Χ Θ Ε Ο Σ . . . . . . . . .
. . . . . . Ν Ο Υ Τ Α Μ Υ Σ Τ Η Ρ Ι Α Α Ν Ε Θ Η Ν Ε Ν Ε Λ Ε Υ Σ Ι Ν Ι Κ Α Ι Τ Α Σ Τ Ο Υ . . . . . . Ο Υ Σ Δ Ι Ο Υ Ρ Ο Η Σ . . Σ Ε Ε Θ Η Κ . . . . . . . .
. . . . . . . Σ Τ Ο Υ Π Α Ι Ο Ν Ο Σ Α Φ Ο Υ Κ Α Θ Α Ρ Μ Ο Σ Ε Π Ρ Α Τ Ο Ν Ε Γ Ε Ν Ε Τ Ο . . . . . Ο Υ Ρ Ρ Σ Τ Ι Α Ο Ν . . . Ε Α Ν Τ . . . . . . .
. . . . . . Δ Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Π Α Ν Δ Ι Ο Ν Ο Σ Τ Ο Υ Κ Ε Κ Ρ Ο Π Ο Σ Α Φ Ο Υ . . Ν Ε Λ Ε Υ Σ Ι Ν Ι Ο Γ Υ Μ Ν Ι Κ Ο Σ . . . . . . . . . . . . Α Φ Ο Υ . . . . . . .
. . . . Α Ι . . Τ Λ Α Υ Κ Α Ι Α Ε Ν Α Ρ Κ Α Δ Ι Α Ι Ε Γ Ε Ν Ε Τ Ο Κ Α Ι Λ . . Κ Κ Ε . . . . Λ Υ Κ Α Ο Ν Ο Σ Ε Δ Ο Θ Η Σ Α Ν . . Τ Ο Ι Σ Ε Λ Λ . . Σ Ι . . . Η . . Ν . . Β Α Σ Ι Λ Ε Υ Ο Ν
Τ Ο Σ Α Θ Η Ν Α Ν Π Α Ν Δ Ι Ο Ν Ο Σ Τ Ο Υ Κ Ε Κ Ρ Ο Π Ο Σ Α Φ Ο Υ Κ Α . . . Γ . . . . . Η Σ Ι Α Ι Η Ρ Α Κ Λ Η Σ . . . . Ν . . . . . . Δ . . . . Δ Ο Σ Τ . . .
Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Η Σ Ι Ν Α Ι Γ Ε Ω Σ Α Φ Ο Υ Α Θ Η Ν Η Σ Ι . . . . . Σ Τ Α Ν Κ Α Ρ Π Α Ν Ε Γ Ε Ν Ε Τ Ο Κ Α Ι Μ Α Ν Τ Ε Υ Ο Μ Ε Ν Ο Σ . . Α Θ Η Ν . . . . Α Λ Ω Ν Ε Ν Η . .
. . . . . . . . Σ Υ Ρ Ο Σ Χ Ε Ν . . Α . . Α Μ Μ Ι Ν Ω Σ Α Ξ Ι Ι Σ Ε Ι Ε Τ Η Χ Δ Δ Δ Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Α Ι Γ . . . Α Φ Ο Υ Θ Η Σ . . . . . .
Α Θ Η Ν Α Ν Τ Α Σ Δ Δ Δ Ε Κ Α Ρ Ο Λ Ε Ι Σ Ε Ι Σ Τ Ο Α Υ Τ Ο Σ Υ Ν Ο Ι Κ Ι Σ Ε Ν Κ Α Ι Π Ο Λ Ι Τ Ε Ι Α Ν Κ Α Ι Τ Η Ν Δ Η Μ Ο Κ Ρ Α Τ Ι Α Ν Α Π Ρ Ε Σ . . . . . . . . .
. . . . Ο Σ Α Θ Η Ν Α Ν Τ Ο Ν Τ Α Ν Ι Σ Ω Μ Ι Α Ν Α Γ Ε Ν Α Ε Θ Η Κ Ε Ε Ι Ν Ι Ν Α Ρ Ο Κ Τ Ε Ι Ν Α Σ Ε Τ Η Ρ Η Η Η Η Ρ Δ Δ Δ Δ Ρ Α Γ Ο Τ Η Σ Α Μ Μ Ο Ν . . . Τ Η . . . . . . . . . .
. . . . Δ Δ Δ Δ Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Θ Η Σ Ε Ω Σ Α Φ Ο Υ Α Ρ Τ Ε Ι Ω Ι Ν Ε Υ Α Δ Ρ Α Σ . . . . Β Α Σ Ι Λ Ε Υ Σ Α Ν Κ Α Ι Τ Ο Ν Α Γ Ω Ν Α . . Ν . . . Η Θ . . Α Ν . . . .
. . . Ε Τ Η Ρ Η Η Η Ρ Δ Δ Ρ Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Θ Η Σ Ε Ω Σ Α Φ Ο Υ Ι . . . Ν Ε Ξ Ε Ι Σ Τ Ρ Ο Ι Α Ν Ε . . . Ρ Α Τ Ε Υ Σ . . Ε Τ Η Ρ Η Η Η Η Ρ Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η
. . . Ε Ξ Ο Β Ε Σ Τ Ρ Ε Ι Σ Κ Α Ι Δ Ε Κ Α Τ Ο Υ Ε Τ Ο Υ Σ Α Φ Ο Υ Τ Ρ Ο Ι Α Η Λ Α Σ Ε Τ Η Ρ Η Η Η Η Δ Δ Δ Δ Ρ Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Ε Υ Ρ Ο Υ Ε Υ Σ Μ Η Ν Ο Ε Θ . .
. . . . . . . . Ν Ο Ξ Ε Β Δ Ο Μ Η Ι Φ Θ Ι Ν Ο Ν Τ Ο Σ        Α Φ Ο Υ Ο Ρ Ε Σ Τ Η . . Ι Ο Ι Α Ι Τ Ω Ν Α Υ Τ Ο . . . . . . . Ι Γ Ι Σ Φ Ο Υ Φ Υ Γ Α Τ Ρ Ι . . . Ο Ν . . . . Γ Ι Σ Φ Ο Υ Κ Α Ι Α Υ . . . .
. . . . . . Α Θ Ε Ν Α Ρ Ε Ι Ο Υ Γ Α Γ Η Η Ν Ο Ρ Ε Σ Τ Η Σ Ε Ν Ι Κ Η Σ Ε Ν . . . . . . . . . Ω Ν . . . Ε Τ Η . . . Η Η Η Η Δ Δ . . Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Δ Η Μ Ο Φ Ω Ν Τ Ο Σ Α Φ Ο Υ . .
. . . . . Κ Υ Ρ Ρ Ω Ι Τ Ε Υ Κ Ρ Ο Σ Κ Ι Σ Ε Ν Ε Τ Η Ρ Η Η Η Η Δ Δ Δ Ρ Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Δ Η Μ Ο Φ Ω Ν Τ Ο Σ Α Φ Ο Υ Ν Ε . . Ε Υ Σ Ε Ι Κ Ι Σ . . . . . Γ . . . Α Λ Α Η Χ Α Ρ . . . Σ Ι . .
. . . . . . Α Ν Ε Φ Ε Σ Ο Ν Ε Ρ Υ Φ Ρ Α Σ Κ Α Σ Ο Μ Ε Ν Α Σ Τ . . Η Ν Κ Α Τ Α Γ Ρ Ο Ν Ο Ν Υ Ρ Ο Κ Ο Λ Ο Φ Ω Ν Α . . Ι Υ Ο Υ Ν Τ Α . . . Α . . . Σ Α Μ Ο Ν . . . . Τ Α . . . Ι Σ Ν Ι . . Ε Γ Ε Ν Ε Τ Ο Ε Τ . . . . .
. . . . . Δ Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν Μ Ε Ν Ε Σ Θ Ω Σ Τ Ρ Ε Ι Σ Κ Α Ι Δ Ε Κ Α Τ Ο Υ . . . Υ Σ Α Φ Ο Υ . . Ι Ο Δ Ο Σ Ο Ρ Ο Ι Η Τ Η Σ . . . . Η Ε Τ Η Ρ Η Ρ Δ Δ . . Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α Ν . .
. . . . . Α Φ Ο Υ Ο Μ Η Ρ Ο Σ Ο Π Ο Ι Η Τ Η Σ Ε Φ Α Ν Η Ε Τ Η Ρ Η Δ Δ Δ Δ Ι Ι Ι Β Α Σ Ι Λ Ε Υ Ο Ν Τ Ο Σ Α Θ Η Ν Α . . . Ι Ο Γ Ν Η Τ Ο Υ Α Φ Ο Υ Φ . . Δ Α Ν Ο Α Ρ Γ Ε Ι Ο Σ Ε Δ Η Μ Ε Υ Σ . . . Ν Ε Υ . .
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Figure 4.47. IG XII 5, 444, fr. A1

The surviving portion (ll. 46–93: fig. 4.48) is displayed in the Ashmolean Museum of the University of Oxford.

– Fragment B (ll. 1–34). This fragment (fig. 4.49) was discovered on the island of Paros in 1897 and is currently preserved in the Archaeological Museum of Paros.

The author of the text of the Parian Marble is unknown, but the date of the composition can be fixed after 264/63 BC thanks to the mention of the name of the Athenian archon Diognetos (l. 3). The stone includes a list of events from the reign of Cecrops (1581/80 BC) to the archonship of Euctemon (299/98 BC) with a main focus on the Athenian history (fig. 4.50). Events are arranged in paragraphs that present a very similar format, which includes a short description of the event, the name of the Athenian king or archon, and the number of years that elapse from 264/63 BC.

In the *Fragmenta Historicorum Graecorum*, Karl Müller published the text of fragment A of the *Marmor Parium* following the edition of August Boeckh in the *Corpus Inscriptionum Graecarum* (2374). The text is preceded by an introduction (*introductio*), is accompanied by a Latin translation and chronological tables, and followed by an extended commentary (*annotatio*): FHG I 533–590.

The digital version of the FHG edition of the Parian Marble is available in the DFHG *main page*, where the inscription is represented according to
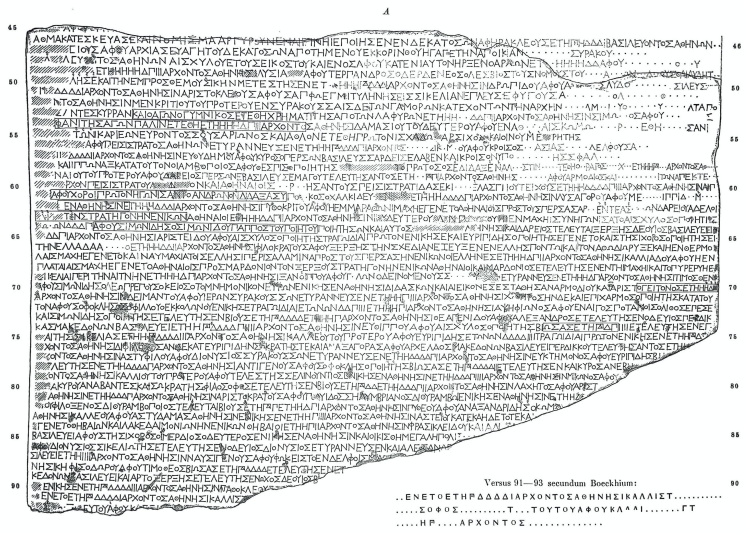
Figure 4.48. IG XII 5, 444, fr. A2
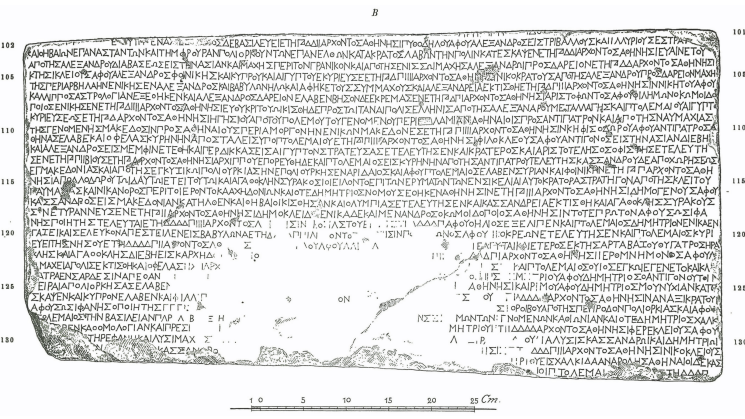
Figure 4.49. IG XII 5, 444, fr. B

Fragment	Entries	Athenian kings/archons	Chronology	Events
A1 **lines 1-45**	**1-29**	Cecrops, Cranaos, Amphictyon, Erichthonios, Pandion, Erechtheus, Pandion, Aegeus, Theseus, Menestheus, Demophon, Menestheus, Diognetos	**ca. 1581/80 – 907-05**	mythological events related to Greek kings, poetry, religion, temple foundations, ...
A2 **lines 46-93**	**30-80**	Pherecles, Aischylos, (681/80) Lysiades, Dropides, Aristocles, Critias the first, Simon, Damasios the second, Comeus, Euthydemos, Harpactides, Lysagoras, Pythocritos, Phainippides the second, Aristeides, Philocrates, Kalliades, Xanthippos, Timosthenes, Adeimantos, Chares Apsephion, Theagenides, Euthippos, Callias the first, Diphilos, Astyphilos, Euctemon, Antigenes, Callias the first, Mikon, Laches, Aristocrates, Pytheus, Callias, Asteios, Phrasicleides, Nausigenes, Cephisodoros, Agathocles, Callistrates	**ca. 895-93 – 354**	annual archonship, innovations in music and theatre, life of tragedians, comedians and other poets, historical events, ...
B **lines 1-34**	**1-27**	Pythodelos, Euainetos, Ctesicles, Nicocrates, Niketos, Aristophon, Euthycrites, Hegesios, Cephisodoros, Philocles, Archippos, Apollodoros, Demogenes, Democleides, Theophrastos, Polemon, Simonides, Hieromnemon, Demetrios, Cairimos, Anaxicrates, Coroibos, Euxenippos, Pherecles, Leostratos, Nicocles, Euctemon	**ca. 336/35 – 299/98**	historical events of the Hellenistic age, life of poets, city foundations, natural events (eclipses, earthquakes), ...

Figure 4.50. Structure of the *Marmor Parium*

the structure of Karl Müller, who arranged the text in two groups of events (*epochae*): part I (0–24) and part II (25–78).[279] Figure 4.51 shows the example of the event (*epocha*) number 3, which is about the trial between Ares and Poseidon on the Areopagus over Halirrhothius. The URN of the event is `urn:lofts:fhg.1.marmor_parium.i:3`.[280] The DFHG *main page* presents the Greek text of the event with the Latin translation and the commentary provided by Müller, together with parallel chronological data that in the printed edition are inserted in four columns beside the commentary.[281] The icon 🏷 below number 3 allows to automatically perform Part-of-Speech tagging of the text through the *OpenNLP POSTagger for Ancient Greek* (see p. 165). The gray sidebar on the left allows to open and consult the corresponding page of the printed edition of the text available in *Google Books*.

4.5.2 EpiDoc XML Encoding of the Marmor Parium

The entire DFHG text of the *Marmor Parium* is accessible and exportable to a CSV file and to two different XML files: 1) a well formed XML file; 2) a TEI EpiDoc XML

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279 *Epocha* and the plural *epochae* (or the corresponding transliterated forms from the Greek ἐποχή) are the terms used in the 19th and 20th century editions of the *Marmor Parium* to refer to the events described in the inscription.

280 On data citation in the DFHG, see section 4.3.5.

281 FHG I 543. The four columns correspond to 1) the number of the year expressed in the *Marmor Parium*, 2) the corresponding year according to the Julian calendar, 3) the corresponding Olympic year, and 4) the corresponding Athenian king or archon.
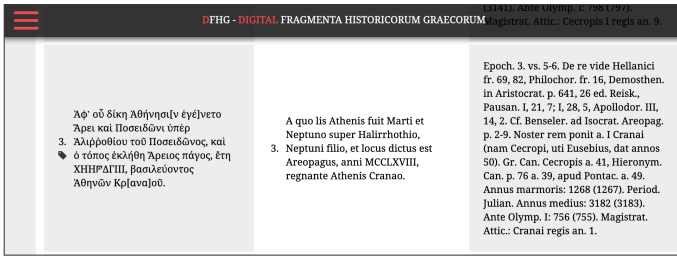
Figure 4.51. DFHG main page: *Marmor Parium*, *epocha* 3

file. In the DFHG, the *Marmor Parium* is classified as `extant text` and therefore this is its structure in the output files.[282] As an example, the above mentioned event (*epocha* 3) is encoded in the following way in the well formed XML file:[283]

```
1  <extant_text id="4" dfhg_id="3839" lofts_urn="urn:lofts:fhg.1.
      marmor_parium.i:3" cite_urn="urn:lofts:fhg.1.marmor_parium:3">
2      <volume>Volumen primum</volume>
3      <sub_volume>APPENDIX</sub_volume>
4      <sub_volume_note></sub_volume_note>
5      <author>MARMOR PARIUM</author>
6      <section></section>
7      <work></work>
8      <work_note></work_note>
9      <work_section></work_section>
10     <work_section_note></work_section_note>
11     <book>I</book>
12     <book_note></book_note>
13     <chapter></chapter>
14     <paragraph>3</paragraph>
15     <sub_paragraph></sub_paragraph>
16     <text>Ἀφ᾽ οὗ δίκη Ἀθήνησι[ν ἐγέ]νετο Ἄρει καὶ Ποσειδῶνι ὑπὲρ
      Ἀλιρροθίου τοῦ Ποσειδῶνος, καὶ ὁ τόπος ἐκλήθη Ἄρειος πάγος, ἔτη
      ΧΗΗ&#x10144;ΔΓΙΙΙ, βασιλεύοντος Ἀθηνῶν Κρ[ανα]οῦ.</text>
17     <translation>A quo lis Athenis fuit Marti et Neptuno super
      Halirrhothio, Neptuni filio, et locus dictus est Areopagus, anni
      MCCLXVIII, regnante Athenis Cranao.</translation>
18     <commentary>Epoch. 3. vs. 5–6. De re vide Hellanici fr. 69, 82,
      Philochor. fr. 16, Demosthen. in Aristocrat. p. 641, 26 ed. Reisk
      ., Pausan. I, 21, 7; I, 28, 5, Apollodor. III, 14, 2. Cf. Benseler
      . ad Isocrat. Areopag. p. 2–9. Noster rem ponit a. I Cranai (nam
      Cecropi, uti Eusebius, dat annos 50). Gr. Can. Cecropis a. 41,
```

---

282 On the outputs of DFHG data, see section 4.3.7. Files of the Parian Marble are accessible in the DFHG website and in the GitHub repository of the project.

283 https://github.com/DFHG-project/volume_1/blob/master/data/xml/MARMOR_PARIUM.xml

```
        Hieronym. Can. p. 76 a. 39, apud Pontac. a. 49. Annus marmoris:
        1268 (1267). Period. Julian. Annus medius: 3182 (3183). Ante Olymp
        . I: 756 (755). Magistrat. Attic.: Cranai regis an. 1.</commentary
        >
19      <note></note>
20      <page>542</page>
21    </extant_text>
```

The following lines show the same example encoded in the EpiDoc TEI XML file:[284]

```
1  <div type="textpart">
2      <p n="3">
3          <ref target="http://www.dfhg-project.org/DFHG/index.php?volume=
      Volumen primum#urn:lofts:fhg.1.marmor_parium.i:3">Ἀφ᾽ οὗ δίκη
      Ἀθήνησι[ν ἐγέ]νετο Ἄρει καὶ Ποσειδῶνι ὑπὲρ Ἀλιρροθίου τοῦ
      Ποσειδῶνος, καὶ ὁ τόπος ἐκλήθη Ἄρειος πάγος, ἔτη
      ΧΗΗ&#x10144;ΔΓΙΙΙ, βασιλεύοντος Ἀθηνῶν Κρ[ανα]οῦ.
4              <note type="translation"> A quo lis Athenis fuit Marti et
      Neptuno super Halirrhothio, Neptuni filio, et locus dictus est
      Areopagus, anni MCCLXVIII, regnante Athenis Cranao. </note>
5          </ref>
6      </p>
7  </div>
```

Given that one of the goals of the DFHG project is to go beyond the printed collection edited by Karl Müller and connect its data with external resources, other editions of the *Marmor Parium* have been digitized to include also fragment B that was discovered in Paros in 1897 after the publication of the *Fragmenta Historicorum Graecorum.*[285]

As of 2021, three editions have been encoded according to the EpiDoc Guidelines (version 9.1):[286] IG XII 5, 444, FGrHist 239, and Rotstein (2016) 21–38. The text of the *Inscriptiones Graecae* is the first critical edition of the complete Parian Marble and was published in 1903. The year after, Felix Jacoby published a new edition of the stone in his *Habilitationsschrift*, that was later superseded in 1929 by his own other edition in the second part of *Die Fragmente der griechischen Historiker* (*Zeitgeschichte*).[287] Finally, in 2016 Andrea Rotstein published a new edition of the Parian Marble based on her autopsy of the fragments of the stone

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284 https://github.com/DFHG-project/volume_1/blob/master/data/epidoc_xml/MARMOR_P
     ARIUM.xml. On the absence of the commentary in the TEI EpiDoc XML output, see p.
     192.
285 Rotstein (2016) 6–7.
286 See https://github.com/DigitalMarmorParium/EpiDoc.
287 Jacoby (1904).

for a new commentary about the literary history of the text of the inscription.[288]

From an encoding point of view, the Parian Marble has interesting characteristics that have been addressed as part of the implementation of the EpiDoc Guidelines.[289] First of all, being a chronicle, the text includes chronological data in the form of Attic acrophonic numerals and names of Athenian kings and archons. The system of the so called Attic acrophonic numerals contained six simple symbols (that, except for 1, derived from the first letters of the ancient Greek words that the symbols represented) and four compounds:

Table 4.1. Attic acrophonic numerals

I	1	Ͷ	50
Γ	5 = π(έντε)	Ͷ	500
Δ	10 = δ(έκα)	Ͷ	5000
H	100 = h(εκατόν)	Ͷ	50,000
X	1000 = χ(ίλιοι)		
M	10,000 = μ(ύριοι)		

The system was used only for cardinal numerals and symbols were combined with an additive notation in descending order (see table 4.2).[290] The author of the text of the Parian Marble used only the following simple acrophonic numerals and compounds for purposes of chronology, because he wanted to express the number of years that elapsed from 264/63 BC and the age of people mentioned in the text of the stone:[291]

I   Γ   Δ   Ͷ   H   Ͷ   X

An example is the above mentioned event number 3, which is dated to 1531/30 BC thanks to the name of the Athenian king Cranaus and to the reference to the

290 For a detailed description of the system of acrophonic numerals with examples, see Keil (1894) 253 n. 1, Tod (1911–1912), Larfeld (1914) 291–293, Tod (1926–1927), Tod (1936–1937), Guarducci (1967) 417–422, Threatte (1980) 110–117.

291 Tod (1911–1912) 114 (31).

Table 4.2. Attic acrophonic numerals

I	1	ΔΓΙ	16	ΔΔΔΔ	40	X	1000
II	2	ΔΓΙΙ	17	𐅄	50	XX	2000
III	3	ΔΓΙΙΙ	18	𐅄Δ	60	XXX	3000
IIII	4	ΔΓΙΙΙΙ	19	𐅄ΔΔ	70	XXXX	4000
Γ	5	ΔΔ	20	𐅄ΔΔΔ	80	𐅆	5000
ΓΙ	6	ΔΔΙ	21	𐅄ΔΔΔΔ	90	𐅆X	6000
ΓΙΙ	7	ΔΔΙΙ	22	H	100	𐅆XX	7000
ΓΙΙΙ	8	ΔΔΙΙΙ	23	HH	200	𐅆XXX	8000
ΓΙΙΙΙ	9	ΔΔΙΙΙΙ	24	HHH	300	𐅆XXXX	9000
Δ	10	ΔΔΓ	25	HHHH	400	M	10,000
ΔΙ	11	ΔΔΓΙ	26	𐅅	500	MM	20,000
ΔΙΙ	12	ΔΔΓΙΙ	27	𐅅H	600	MMM	30,000
ΔΙΙΙ	13	ΔΔΓΙΙΙ	28	𐅅HH	700	MMMM	40,000
ΔΙΙΙΙ	14	ΔΔΓΙΙΙΙ	29	𐅅HHH	800	𐅇	50,000
ΔΓ	15	ΔΔΔ	30	𐅅HHHH	900	*etc.*	

year 1268, which means that the event occurred 1268 years before 264/63 BC:[292]

> MP A1, 3: Ἀφ᾽ οὗ δίκη Ἀθήνησι [ἐγέ]νετο Ἄρει καὶ Ποσειδῶνι ὑπὲρ
> Ἁλιρροθίου τοῦ Ποσειδῶνος, καὶ ὁ τόπος ἐκλήθη Ἄρειος πάγος, ἔτη
> ΧΗΗ𐅄ΔΓΙΙΙ, βασιλεύοντος Ἀθηνῶν Κρ[ανα]οῦ.

The EpiDoc community has addressed this kind of numeral and chronological notation, which is marked up in XML in the following way:[293]

```
1  <seg type="entry" n="3">ἀφ᾽ οὗ δίκη
   Ἀθήνησι <supplied reason="lost">ἐγέ</supplied>νετο Ἄρει καὶ
   Ποσειδῶνι ὑπὲρ Ἁλιρροθίου τοῦ Ποσειδῶνος, καὶ ὁ τόπος
   ἐκλήθη <lb n="6"/> Ἄρειος Πάγος, ἔτη <date from="-1531" to="-1530"
    when-custom="1268" datingMethod="#marmor_parium"><num type="
   acrophonic">ΧΗΗ&#x10144;Δ&#x10143;ΙΙΙ</num></date>, βασιλεύοντος
   Ἀθηνῶν Κρ<supplied reason="lost">ανα</supplied>οῦ.</seg>
```

As it is possible to see in this example, the EpiDoc Guidelines allow to represent both the type of numeral ("acrophonic") and the chronological information (1531/30 BC) associated to it according to the dating method of the Parian Marble

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292 The text is from the edition of Rotstein (2016) 38: "From the time a trial occured in Athens between Ares and Poseidon over Halirrhothius, Poseidon's son — hence the place was called Areopagos — 1268 years (= 1531/0 BCE), when Cranaus was king of Athens." See Jacoby (1904) 136–137, FGrHist 239A, BNJ 239, Harding (2008) 33–36. On the complexities of the chronology of the *Marmor Parium* and on its ambiguities, see Maddoli (1975) 51–61. From now onwards and unless specified, events of the *Marmor Parium* are cited according to the numbers of the edition of Rotstein (2016): MP A1 (0–29), A2 (30–80), B (1–27).

293 https://github.com/DigitalMarmorParium/EpiDoc/blob/master/rotstein_2016.xml

("#marmor_parium"). The kind of calendar that is adopted has to be declared in the header (`<teiHeader>`) of the EpiDoc XML file within the element `<calendarDesc>`:

```
<calendarDesc>
    <calendar xml:id="marmor_parium">
        <p>Marmor Parium year, elapsing from 264/63 BC</p>
    </calendar>
    <calendar xml:id="attic">
        <p>Attic calendar</p>
    </calendar>
</calendarDesc>
```

In the attributes `@from` and `@to` of the element `<date>`, the normalised Gregorian dates are used according to the encoded edition, in the W3C four-digit format, with an hyphen (-) for BC dates ("-1531" and "-1530"). The number of years expressed in the text of the *Marmor Parium* is a value ("1268") of the attribute `@when-custom`, which is used for a non-standard dating system. The attribute `@datingMethod` explains the dating system ("#marmor_parium") and points to the calendar declaration in the header of the XML file. The element `<num>`, which includes the acrophonic numeral, doesn't have a `@value` attribute because the value of the number is already expressed in details in the element `<date>`.

The author of the text of the *Marmor Parium* uses acrophonic numerals to express also ages of people, like for example the age of Aeschylus at the time of the battle at Marathon:[294]

MA A2, 48: ἀφ' οὗ ἡ ἐμ Μαραθῶνι μάχη ἐγένετο Ἀθηναίοις πρὸς τοὺς Πέρσας Ἀρ[ταφ]έ[ρνην τε τὸ]ν Δαρείου ἀδελφι[δοῦν κα]ὶ [Δᾶ]«τ[ι]ν στρατηγόν, ἣν ἐνίκων» Ἀθηναῖοι, ἔτη ΗΗΔΔΓΙΙ, ἄρχοντος Ἀθήνησιν τ[ο]ῦ δευτέρου [Φ]α[ι]ν[ι]π[πίδ]ου· ἧι ἐν μάχηι συνηγωνίσατο Αἰσχύλος ὁ ποιητής, ἐτῶν ὢν ΔΔΔΓ.

---

294 The text is from the edition of Rotstein (2016) 44: "From the time the battle in Marathon occured, the Athenians (fighting) against the Persians and Ar[taph]e[rnes], Darius's neph[ew, an]d [Da]tis the commander, which the Athenians won, 227 years (= 490/89 BCE), when [Ph]a[i]n[i]p[pid]es t[h]e second was archon in Athens. In this battle fought Aeschylus the poet, being 35 years of age." See Jacoby (1904) 112, Maddoli (1975) 33, and Harding (2008) 102. There are twelve references to ages in the text of the Parian Marble: MP A2, 48 (Aeschylus), 56 (Sophocles), 57 (Simonides), 59 (Aeschylus), 60 (Euripides), 63 (Euripides), 64 (Sophocles), 66 (Socrates), 69 (Philoxenus), 76 (Timotheus); B, 11 (Aristoteles), 15 (Theophrastus).

The following lines show the EpiDoc XML encoding of the event:[295]

```
1  <seg type="entry" n="48">ἀφ' οὗ ἡ ἐμ Μαραθῶνι μάχη ἐγένετο Ἀθηναίοις
       πρὸς τοὺς Πέρσας Ἀρ<supplied reason="lost">ταφ</supplied>έ<
       supplied reason="lost">ρνην τε τὸ</supplied>ν Δαρείου ἀδελφ<lb n=
       "63"/><supplied reason="lost">δοῦν κα</supplied>ὶ <supplied reason
       ="lost">Δᾶ</supplied><add place="overstrike">τ<supplied reason="
       lost">ι</supplied>ν στρατηγόν, ἣν ἐνίκων</add> Ἀθηναῖοι, ἔτη <date
        from="-0490" to="-0489" when-custom="227" datingMethod="#
       marmor_parium"><num type="acrophonic">ΗΗΔΔ&#x10143;ΙΙ</num></date>
       , ἄρχοντος Ἀθήνησιν τ<supplied reason="lost">ο</supplied>ῦ
       δευτέρου <supplied reason="lost">Φ</supplied>α<supplied reason="
       lost">ι</supplied>ν<supplied reason="lost">ι</supplied>π<supplied
       reason="lost">πίδ</supplied>ου· ἧι ἐν μάχηι συνηγωνίσατο Αἰσχύλος
       ὁ ποιητής, <lb n="64"/> ἐτῶν ὢν <date type="age" dur="P35Y"><num
       type="acrophonic">ΔΔΔ&#x10143;</num></date>.</seg>
```

In this example, acrophonic numerals are used to express the date of the battle
at Marathon (ΗΗΔΔΓΙΙ = 227) and the age of Aeschylus (ΔΔΔΓ = 35). Also in
the second case, the EpiDoc Guidelines allow to specify the type of chronological
information ("age") and the corresponding number in Arabic numerals (35).[296]

In the XML files showed above, the *Greek Acrophonic Attic Five* (Γ) and the
Greek Acrophonic Attic Fifty (𐅄) are represented with their corresponding HTML
numeric codes 𐅄 and 𐅃. The reason is due to the fact that, even
if both characters belong to the Unicode block *Ancient Greek Numbers* in the Sup-
plementary Multilingual Plane, not every font supports them.[297] In the XML files
of the *Digital Marmor Parium* project, three acrophonic numerals of the text of
the Parian Marble are represented with the following HTML numeric codes:

Γ	*Greek Acrophonic Attic Five*	𐅃
𐅄	*Greek Acrophonic Attic Fifty*	𐅄
𐅅	*Greek Acrophonic Attic Five Hundred*	𐅅

This is an issue also for web browsers, where the web page stylesheet needs to
load a font that includes a graphic representation (glyph) of the UTF codes of
Unicode *Ancient Greek Numbers*. Figure 4.52 shows the example of *epocha* 3 in

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295 https://github.com/DigitalMarmorParium/EpiDoc/blob/master/rotstein_2016.xml

296 The values of the attribute @type for the text of the *Marmor Parium* in the EpiDoc XML
version of IG XII 5, 444 are "age" for a person's age (*epochae* 48, 56, 60) and "life-span" for
the age at death (*epochae* 59, 63, 64, 66, 69, 76, 112, 116). The attribute @dur, that expresses
durations of time, includes values that follow rules codified in the *W3C Recommendation
on Datatypes*. On the use of this attribute for the text of the *Marmor Parium*, see also the
examples of the following pages.

297 See https://unicode.org/charts/PDF/U10140.pdf: Unicode Standard, Version 13.0. On
character encoding for ancient Greek and on Unicode, see Tauber (2019). Solutions have
been also discussed and partly found for typesetting Greek Attic numerals with LaTeX: see
Syropoulos (1997), Beccari (2002), Beccari (2016), Syropoulos (2018).

the DFHG *main page*. In this case the font used by the web page to represent the text doesn't support the *Greek Acrophonic Attic Fifty* (𐅵), which is therefore substituted by a placeholder that shows the corresponding Unicode code.

Ἀφ ᾽ οὗ δίκη Ἀθήνησι[ν
ἐγέ]νετο Ἄρει καὶ Ποσειδῶνι
ὑπὲρ Ἁλιρροθίου τοῦ
Ποσειδῶνος, καὶ ὁ τόπος
ἐκλήθη Ἄρειος πάγος, ἔτη
ΧΗΗ𐅢ΔΓΙΙΙ, βασιλεύοντος
Ἀθηνῶν Κρ[ανα]οῦ.
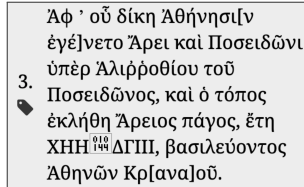
Figure 4.52. DFHG main page: first version with default font
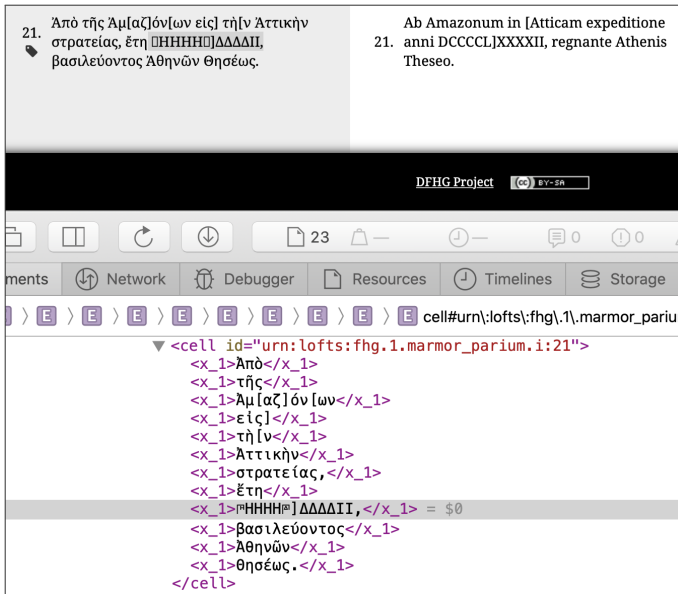
Figure 4.53. DFHG main page: Safari web browser version 13.0.4 (15608.4.9.1.3)

This problem has been solved by choosing a font that contains glyphs of Unicode *Ancient Greek Numbers* and by embedding it into the web page with Greek and Greek Extended languages.[298] Figure 4.51 shows the correct representation of the *Greek Acrophonic Attic Fifty* (𐅵) in the current version of the DFHG *main page*. Some web browsers have representation problems also with a suitable font. For example, macOS Safari is not able to represent Unicode *Ancient Greek Numbers* rendering the web page, even if it correctly shows them in the HTML code. Figure

298 In this case the Google font `Noto Serif` has been chosen.

4.53 shows the example of *epocha* 21 of the Parian Marble in the DFHG *main page*, where both the *Greek Acrophonic Attic Five Hundred* (𐅅) and the *Greek Acrophonic Attic Fifty* (𐅄) are represented with two empty squares in the web page (upper part of the figure) and with the correct glyphs in the code inspection window (lower part of the figure). Attic acrophonic numerals that express dates in the Parian Marble are accompanied by names of Athenian kings and archons, who are encoded as prosopographical data according to the EpiDoc guidelines.[299] An example is the event concerning the foundation of Syracuse:[300]

> MP A2, 31: ἀφ' οὗ Ἀρχίας Εὐαγήτου δέκατος ὢν ἀπὸ Τημένου ἐκ Κορίνθου ἤγαγε τὴν ἀποικίαν [καὶ ἔκτισε] Συρακού[σσας, ἔτη - - - β]α[σι]λεύ[ο]ντος Ἀθηνῶν Αἰσχύλου ἔτους εἰκοστοῦ καὶ ἑνός.

The following lines show the EpiDoc XML encoding of the event:

```
1 <seg type="entry" n="31">ἀφ' οὗ <persName><name>Ἀρχίας</name> <persName
    ><name>Εὐαγήτου</name></persName></persName> δέκατος ὢν ἀπὸ <
    persName><name>Τημένου</name></persName> ἐκ <placeName>Κορίνθου</
    placeName> ἤγαγε τὴν ἀποικίαν <supplied reason="lost">καὶ ἔκτισε</
    supplied> <placeName>Συρακού<supplied reason="lost">σσας</supplied
    ></placeName>, <supplied reason="lost">ἔτη</supplied> <date><num
    type="acrophonic"><gap reason="lost" extent="unknown" unit="
    character"/></num></date>,<lb n="48"/><gap reason="lost" quantity=
    "2" unit="character"/> <supplied reason="lost">βασι</supplied>λεύ<
    supplied reason="lost">ον</supplied>τος Ἀθηνῶν <persName><name>
    Αἰσχύλου</name></persName>, <date type="office-span" dur="P21Y">
    ἔτους εἰκοστοῦ καὶ ἑνός</date>.</seg>
```

In this case the name of the Athenian king Aeschylus is encoded as a personal name (`<persName>`) like the names of Archias son of Euagetes and Temenus, who are mentioned in the same passage.[301]

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299 The exception is the name of the archon of Paros, which is partly lost ([]υάνακτος) and mentioned in the first paragraph of the stone together with the name of the Athenian archon Diognetos.

300 The text is from the edition of Rotstein (2016) 42: "From the time Archias, son of Euagetes, being tenth from Temenus, led the settlement from Corinth [and founded] Syracu[se, . . . years], when Aeschylus w[a]s [k]ing of Athens, in his twenty-first year." See Jacoby (1904) 94–95.

301 As recommended by EpiDoc (version 9.1), the nested element `<name>` is used to encode not only individual names, but also subparts of personal names. For the text of the Parian Marble, the nested element `<name>` is used for names of fathers and, in three cases, for the name of the mother (MP A1, 12), of the uncle (MP A2, 48), and of the grandfather (MP A2, 49). Another question is about the encoding of the ordinal number of homonymous archons, as for example Κριτίου τοῦ προτέρου in MP A2, 36, where τοῦ προτέρου can be included in the element `<persName>` used to mark up the name of the archon Critias. Another possibility is to include τοῦ προτέρου into a `<genName>` element, even if the risk is to imply a familial relationship and lineage that are not applicable in this case.

The *Personal names and prosopographical links* section of the EpiDoc Guidelines (version 9.1) describes also solutions for specifying the *class of name* (`@type`), the *orthography* and the *primary reference form* (`@nymRef`), and the *identifier* (`@ref`) with a URL or a URI of a personal name in order to connect it with an entry in person databases or online prosopographies.[302]

Future developments of the *Digital Marmor Parium* project will also provide these kinds of data, whose production still depends on an agreement in the community of Classicists about the terminology of classes of ancient Greek names, on the annotation and the lemmatization of ancient Greek named entities (NEs), and on the subsequent creation of authority lists. In this respect, the *Digital Marmor Parium* project already offers the encoding of the inflected forms of personal names of different editions of the Parian Marble in the above described XML files and a complete list of Latinized lemmata of these names.[303] The annotation and encoding of these forms and their corresponding lemmata depend not only on the development of standards and on a discussion in the community of experts, but also on the complexities of ancient texts. The Parian Marble is a fragmented stone with gaps and ambiguous readings. As of today and from a technical point of view, these complexities can be represented in a digital environment, but their encoding, analysis, and annotation require time, editorial efforts, and contributions by epigraphists, philologists, and linguists that will be possible only thanks to the work of future generations of scholars.

The EpiDoc XML example cited above shows also the encoding of the year of Aeschylus' reign (21st) that corresponds to the event of the foundation of Syracuse:

```
1 <supplied reason="lost">βασι</supplied>λεύ<supplied reason="lost">ον</
    supplied>τος Ἀθηνῶν <persName><name>Αἰσχύλου</name></persName>, <
    date type="office-span" dur="P21Y">ἔτους εἰκοστοῦ καὶ ἑνός</date>
```

This encoding is in accordance with the *Dates, dating formulae, ages* section of the EpiDoc Guidelines (version 9.1). Technically, also the name of Aeschylus could be specified with a reference to his role of dating archon with the attributes `@type` and `@role`:

---

302   In the EpiDoc XML file of IG XII 5, 444, the attribute `@type` of the element `<persName>` has been experimentally used with the value `"divine"` for ten occurrences of names of divine beings, in order to distinguish them from names of human beings.

303   The list is available in the *Google Drive* spreadsheet *DMP Chronological Table* of the *Digital Marmor Parium* project and is arranged by *Athenian kings*, *Athenian archons*, and *other names*: see section 4.5.5.

```
1  <supplied reason="lost">βασι</supplied>λεύ<supplied reason="lost">ον</
       supplied>τος Ἀθηνῶν <persName type="archon" role="dating"><name>
       Αἰσχύλου</name></persName>, <date type="office-span" dur="P21Y">
       ἔτους εἰκοστοῦ καὶ ἑνός</date>
```

When both the acrophonic numeral and the name of the Athenian archon (or king) are preserved, two possibilities have been discussed in the EpiDoc community.[304] An example is the date when Croesus sent envoys and offerings to Delphi:[305]

> MP A2, 41: ἀφ' οὗ Κροῖσος [ἐξ] Ἀσίας [εἰς] Δελφοὺς ἀ[- - - ἔτη
> Η]Η[ᴼ]ΔΔΔΔΙΙ, ἄρχοντος Ἀθήνησιν Εὐθυδήμου.

The first possibility is to include the name of the archon in the element `<date>` and add the attribute `@role` in the `<persName>` element, so that both elements of the formula can be extracted together:

```
1  <date from="-0556" to="-0555" when-custom="292" datingMethod="#
       marmor_parium"><num type="acrophonic">ΗΗ&#x10144ΔΔΔΔΙΙ;</num>,
       ἄρχοντος <placeName>Ἀθήνησιν</placeName> <persName type="archon"
       role="dating"><name>Εὐθυδήμου</name></persName></date>
```

The second possibility is to use two different `<date>` elements for the acrophonic numeral and the name of the archon, and nest them into a bigger element`<date>`:

```
1  <date>
2  <date from="-0556" to="-0555" when-custom="292"
3  datingMethod="#marmor_parium"><num type="acrophonic">ΗΗ&#x10144ΔΔΔΔΙΙ;<
       /num></date>,
4  <date from="-0556" to="-0555" when-custom="292"
5  datingMethod="#marmor_parium">ἄρχοντος <placeName>Ἀθήνησιν</placeName>
       <persName type="archon" role="dating"><name>Εὐθυδήμου</name></
       persName> </date>
6  </date>
```

---

304 I'm very grateful to Charlotte Rouché and Simona Stoyanova for this discussion. These possibilities are not yet part of the EpiDoc Guidelines, but are the result of ongoing discussions about the complexities of encoding epigraphical texts.

305 The text is from the edition of Rotstein (2016) 43: "From the time Croesus . . . [from] Asia [to] Delphi, 292 [years] (= 556/5 BCE), when Euthydemus was archon in Athens." See Jacoby (1904) 106–107.

   Other chronological data, that can be currently encoded in EpiDoc XML, are months and days. An example is the event about the conquest of Troy:[306]

   MP A1, 24: ἀφ᾽ οὗ Τροία ἥλω, ἔτη 𝕸ΗΗΗΗΔΔΔΔΓ, βασιλεύοντος Ἀθηνῶν [Μενεσθέ]ως δευτέρου ⟨καὶ εἰκοστοῦ⟩ ἔτους μηνὸς Θ[αργηλιῶ]νος ἑβδόμηι φθίνοντος.

The following lines show the EpiDoc XML encoding of the event, where the Attic month Thargelion and the number of the day (7) can be marked up within the element <date> and with specific attributes:

```
1  <seg type="entry" n="24">ἀφ᾽ οὗ <placeName>Τροία</placeName> ἥλω, ἔτη <
   date from="-1208" to="-1207" when-custom="945" datingMethod="#
   marmor_parium"><num type="acrophonic">&#x10145HHHHΔΔΔΔ;&#x10143;</
   num></date>, βασιλεύοντος Ἀθηνῶν <persName><name><supplied reason=
   "lost">Μενεσθέ</supplied>ως</name></persName> δευτέρου <supplied
   reason="omitted">καὶ εἰκοστοῦ</supplied> ἔτους <date when-custom="
   945-11-24" datingMethod="#attic">μηνὸς Θ<supplied reason="lost">
   αρ<lb n="40" break="no"/>γηλιῶ</supplied>νος <num value="7">
   ἑβδόμηι</num> φθίνοντος</date>.</seg>
```

Still open are questions about the encoding of collective nouns (e.g., τῶν Ἰδαίων Δακτύλων in MP A1, 11 and ὁ Περσῶν βασιλεὺς in MP A2, 42), of groups of people from the same family (e.g., τῶν πεντήκοντα Δαναίδων in IG XII 5, 444, *ep.* 9), and of the incomplete restoration of dates (e.g., *ibid.*, ll. 57, 59, and 81).

4.5.3 The Geography of the Marmor Parium

The EpiDoc Guidelines allow to encode also places mentioned in the text of the *Marmor Parium*. An example is the event concerning the death of the poet Aeschylus:[307]

   MP A2, 59: ἀφ᾽ οὗ Αἰσχύλος ὁ ποιητής, «βιώσας ἔτη 𝕸ΔΓ»IIII, ἐτελεύτησεν ἐγ [Γέλ]αι τῆς Σικελίας, ἔτη Η𝕸ΔΔΔΔIII, ἄρχοντος Ἀθήνησι Καλλέου τοῦ προτέρου.

The following lines show the EpiDoc XML encoding of the event, where Γέλαι and Σικελίας are marked up within the element <placeName>:

---

306 The text is from the edition of Rotstein (2016) 41: “From the time Troy was conquered, 945 years (= 1209/8 BCE), when [Menesthe]us was king of Athens, in his <twenty> second year, in the month of Th[argeli]on, in the seventh day, (counting) from the end of the month.” See BNJ 239.

307 The text is from the edition of Rotstein (2016) 45: “From the time Aeschylus the poet, being 69 years of age, died in [Gel]a on Sicily, 193 years (= 456/5 BCE), when Calleas the elder was archon in Athens.”

```
1  <seg type="entry" n="59">ἀφ' οὗ Αἰσχύλος ὁ ποιητής, <add place="
   overstrike">βιώσας ἔτη</add> <date type="life-span" dur="P69Y"><
   num type="acrophonic"><add place="overstrike">&#x10144Δ;&#x10143;<
   /add>IIII</num></date>, ἐτελεύτησεν ἐγ <placeName><supplied reason
   ="lost">Γέ<lb n="75" break="no"/>λ</supplied>αι τῆς <placeName>
   Σικελίας</placeName></placeName>, ἔτη <date from="-0456" to="-0455"
   " when-custom="193" datingMethod="#marmor_parium"><num type="
   acrophonic">H&#x10144ΔΔΔΔIII;</num></date>, ἄρχοντος Ἀθήνησι
   Καλλέου τοῦ προτέρου.</seg>
```

The text of the Parian Marble is rich of other occurrences that can be classified in the group of geographical terms, like mountains (e.g., τὸν Παρνασσὸν: MP A1, 2), tribunals (e.g., Ἀρείωι Πάγωι: MP A1, 25), ethnics (e.g., ὁ Φρὺξ: MP A1, 10), and names of people (e.g., Ἀθηναίους: *ibid.*). Beside the element <placeName>, the EpiDoc Guidelines include also the elements <orgName> and <geogName> to mark up these examples. Moreover, the attribute @nymRef can be added with a URL or a URI that points to local databases or online authority lists and gazetteers such as *Pleiades*.

In terms of place names and instead of marking them up within the same XML file, another possibility is to annotate them externally. In this regard, the *Pelagios Network* has been developing and maintaining *Recogito*, which is an online platform for collaborative document annotation and visualization.[308] *Recogito* has been used to experiment with the annotation of places in the text of the *Marmor Parium*. *Recogito* enables users to annotate *places*, *persons*, and *events*, but the annotations of the *Marmor Parium* are for now limited to *places*, given that the goal is to focus on the "geography" of the incription.[309] The plain text (.txt extension) of the edition of the *Marmor Parium* published in IG XII 5, 444 has been uploaded in *Recogito* in order to perform manual annotations.[310]

---

308 See Simon/Barker et al. (2017), and Bodard/Gheldof et al. (2016) (Paper 2. *Early Geographic Documents and the Pelagios Commons*).

309 *Place*, *Person*, and *Event* are part of the *Recogito* vocabulary. On the complexities of defining and annotating historical *places*, *locations*, and *names*, see the *Pleiades* website.

310 The text has been taken from the collection PHI *Greek Inscriptions*: https://epigraphy.pack hum.org/text/77668. On this collection, see p. 69.
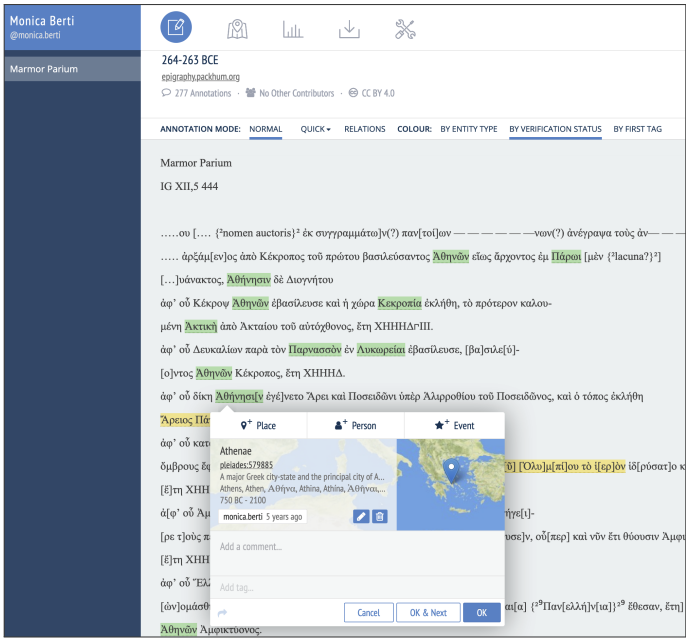
Figure 4.54. *Recogito*: document view with annotations of the *Marmor Parium*

Figure 4.54 shows the *Document view* of *Recogito* with the text of the *Marmor Parium* that preserves the lign arrangement of the printed edition of the IG with *place* annotations highlighted in green and in yellow.[311] The document is accessible through a *Recogito* account and is provided with a URL that allows to link it also without logging in *Recogito*: https://recogito.pelagios.org/document/uyn xk84uyyizck. Metadata of every annotated place is visible in a pop-up window that shows the corresponding entry of the place in *Pleiades* with its URI, a brief description, a map, and the possibility to edit the annotation and add a commentary and tags. The hyperlink of the URI points to the relevant page in *Pleiades*, where it is possible to obtain geo-coordinates and further information about the annotated place (in this case *Athenae* = `pleiades:579885`).

---

311 The arrangement of the printed edition of the IG and consequently of PHI don't correspond to the actual arrangement of lines on the stone and numbers of line have been added by the editor of the IG to show the correspondence. As for now, the text in *Recogito* doesn't include line numbers, which can be easily obtained through the text in the PHI collection. The annotation of places of the *Marmor Parium* was originally performed in the Summer 2014, when *Recogito* was still limited to the annotation of *places* and when it was not possible to annotate words written between two lines of the inscription. This functionality is now active and places between lines have been added to the annotation.

In order to produce an annotation, the user has to highlight the relevant word or words. At this point and if available, *Recogito* automatically offers a list of places that match the annotation and the user can select one of them. If not available, *Recogito* gives the possibility to *search* the place in its gazetteers and select the desired option.[312] Given that the *Marmor Parium* is a fragmented inscription and the text of the IG edition is full of editorial critical signs, this function doesn't always work and places have to be manually searched.[313]

As of 2021, 267 *entities* (occurrences) have been annotated in the text of the *Marmor Parium*.[314] Five *entities* have been *flagged* and are not *verified*, because it has not been possible to find a correspondent *Pleiades* URI or because their data are not present in the gazetteers made available through *Recogito*:[315] τοῦ Διὸ[ς τ]ο[ῦ] [Ὀλυ]μ[πί]ου τὸ ἱ[ερ]ὸν, Ἄρειος Πάγος, Καδμεί-αν, Ἀρεί[ωι] Πάγωι, and Κυβέλοις. According to the *Annotation statistics* provided by *Recogito*, a total of 142 unique *places* of the *Marmor Parium* are *resolved*.[316] Table 4.3 shows a list of these places with the number of their occurrences and with their corresponding URIs:[317]

Table 4.3. *Marmor Parium: Recogito* resolved places

Ἀθηνῶν	30	http://pleiades.stoa.org/places/579885
Ἀθήνησιν	42	http://pleiades.stoa.org/places/579885
Ἀθήνησι	35	http://pleiades.stoa.org/places/579885
ἄστ[ει	1	http://pleiades.stoa.org/places/579885
Ἀθήνησ[ι	1	http://pleiades.stoa.org/places/579885
Ἀθήνη]σ[ι	2	http://pleiades.stoa.org/places/579885
Ἀθήνησ]ι	1	http://pleiades.stoa.org/places/579885

312 As of 2021, *Recogito* makes available the following gazetteers: *Pleiades* (*Pleiades Gazetteer of the Ancient World*), CHGIS (*China Historical GIS*), DPP *Places* (*Places from the Digitizing Patterns of Power project*), DARE (*Digital Atlas of the Roman Empire*), MoEML (*Map of Early Modern London*), HGIS *de las Indias* (*Historical-Geographic Information System for Spanish America, 1701–1808*), GeoNames (*A subset of GeoNames populated places, countries and first-level administrative divisions*), Kima (*Kima Historical Gazetteer*).

313 Editorial critical signs have been kept in *Recogito* because they have to be considered part of the annotation.

314 *Entity* is the term used in *Recogito*. Names of people like Ἀθηναῖοι or Ἕλληνες have not been annotated. As mentioned above, editorial critical signs and hyphens of words between two lines of the inscription are part of the annotated text. The context also allows to disambiguate forms like ἄστ[ει (`pleiades:579885`), πόλις ἑλληνίς (`pleiades:59672`), and νήσου (`pleiades:707498`).

315 The first and the last *entities* don't have a *Pleiades* URI, while the other three have a *Pleiades* URI that is not retrievable through *Recogito*. In these cases the color of the annotation is yellow and the toponym is *flagged*. The verbs *flag* and *verify* are *Recogito* terms, like *resolve* (see below).

316 https://recogito.pelagios.org/document/uynxk84uyyizck/stats

317 The total number including occurrences is 262 (*resolved places*).

Table 4.3 *continued*

[Ἀθή]νησι	1	http://pleiades.stoa.org/places/579885
Ἀθηνησι	1	http://pleiades.stoa.org/places/579885
Ἀθ[ήνη]-[σι	1	http://pleiades.stoa.org/places/579885
Ἀ-θήνας	1	http://pleiades.stoa.org/places/579885
Ἀθήνη]σιν	1	http://pleiades.stoa.org/places/579885
Ἀθη[νῶν]	1	http://pleiades.stoa.org/places/579885
Ἀθηνῶ[ν	1	http://pleiades.stoa.org/places/579885
[Ἀθήνη]σιν	1	http://pleiades.stoa.org/places/579885
Ἀθ[ήνη]σ[ιν]	1	http://pleiades.stoa.org/places/579885
Ἀθή-νησι	1	http://pleiades.stoa.org/places/579885
Ἀθ[ήν]αις	1	http://pleiades.stoa.org/places/579885
Αθήνησι	1	http://pleiades.stoa.org/places/579885
Ἀθήνας	3	http://pleiades.stoa.org/places/579885
Ἀθήνησι[ν	1	http://pleiades.stoa.org/places/579885
Ἀθή]-νησι	1	http://pleiades.stoa.org/places/579885
Ἀθήνη]-[σι]	1	http://pleiades.stoa.org/places/579885
Συρακού[σσας	1	http://pleiades.stoa.org/places/462503
Συρακούσσαις	1	http://pleiades.stoa.org/places/462503
[Συρακουσσῶν]	1	http://pleiades.stoa.org/places/462503
Συρακουσσῶν	2	http://pleiades.stoa.org/places/462503
Συρακουσ-σ[ῶ]ν	1	http://pleiades.stoa.org/places/462503
Μακεδόνων	4	http://pleiades.stoa.org/places/491656
Μακεδονίας	1	http://pleiades.stoa.org/places/491656
Μακεδονίαν	1	http://pleiades.stoa.org/places/491656
Δελφοῖ]ς	1	http://pleiades.stoa.org/places/540726
Δελφοὺς	1	http://pleiades.stoa.org/places/540726
Δελφοῖς	2	http://pleiades.stoa.org/places/540726
Πυθία]ς	1	http://pleiades.stoa.org/places/540726
Αἰγύπτου	2	http://pleiades.stoa.org/places/766
Αἴγυπτον	1	http://pleiades.stoa.org/places/766
Αἰγύπτο[υ]	1	http://pleiades.stoa.org/places/766
νήσου	1	http://pleiades.stoa.org/places/707498
Κύπρωι	1	http://pleiades.stoa.org/places/707498
Κύπρου	1	http://pleiades.stoa.org/places/707498
Κύπρον	1	http://pleiades.stoa.org/places/707498
Θῆβαι	1	http://pleiades.stoa.org/places/541138
Θηβῶν	1	http://pleiades.stoa.org/places/541138
Θή]βας	1	http://pleiades.stoa.org/places/541138
Θήβας	1	http://pleiades.stoa.org/places/541138

Table 4.3 *continued*

Σιχελίαν	1	http://pleiades.stoa.org/places/462492
Σιχελίας	1	http://pleiades.stoa.org/places/462492
[Σ]ι[χ]ελίαι	1	http://pleiades.stoa.org/places/462492
Ἐλευσῖνι	2	http://pleiades.stoa.org/places/579920
Ῥαρίαι καλουμένηι Ἐλευσῖνι	1	http://pleiades.stoa.org/places/579920
Ἀσίαν	3	http://pleiades.stoa.org/places/981509
Ἑλλάδα	3	http://pleiades.stoa.org/places/1001896
Ἀττικὴν	1	http://pleiades.stoa.org/places/579888
Κεκροπία	1	http://pleiades.stoa.org/places/579888
Ἀκτικὴ	1	http://pleiades.stoa.org/places/579888
Περσῶν	2	http://pleiades.stoa.org/places/922695
Φοινίκης	1	http://pleiades.stoa.org/places/678334
Φοινίκην	1	http://pleiades.stoa.org/places/678334
Λυκωρείας	1	http://pleiades.stoa.org/places/543770
Λυκωρείαι	1	http://pleiades.stoa.org/places/543770
Κυρήνην	2	http://pleiades.stoa.org/places/373778
Ῥοδίας	1	http://pleiades.stoa.org/places/590031
Ῥόδον	1	http://pleiades.stoa.org/places/590031
Θερμο[πύ]-λαις	1	http://pleiades.stoa.org/places/541140
Θερμοπύλαις	1	http://pleiades.stoa.org/places/541140
Σάρδεις	1	http://pleiades.stoa.org/places/550867
Σάρδεσιν	1	http://pleiades.stoa.org/places/550867
Καρχηδ[όνα	1	http://pleiades.stoa.org/places/314921
Κα]ρχ[ηδόνα	1	http://pleiades.stoa.org/places/314921
Τροίαν	1	http://pleiades.stoa.org/places/550595
Τροία	1	http://pleiades.stoa.org/places/550595
[Ἰωνί]αν	1	http://pleiades.stoa.org/places/550597
Ἰωνίαν	1	http://pleiades.stoa.org/places/550597
Βαβυλὼν	1	http://pleiades.stoa.org/places/893951
Βαβυλῶνα	1	http://pleiades.stoa.org/places/893951
[Νεμέ]α[ι	1	http://pleiades.stoa.org/places/570504
[Τέω]	1	http://pleiades.stoa.org/places/550913
Κολοφῶνα	1	http://pleiades.stoa.org/places/599577
Σάμον	1	http://pleiades.stoa.org/places/599926
Αἴτνην	1	http://pleiades.stoa.org/places/462077
Αἰγὸς ποταμοῖς	1	http://pleiades.stoa.org/places/501336
Λαμίαν	1	http://pleiades.stoa.org/places/540902
Ἀμοργόν	1	http://pleiades.stoa.org/places/599484
Πάρωι	1	http://pleiades.stoa.org/places/599868

Table 4.3 *continued*

Φθι]ώτιδος	1	http://pleiades.stoa.org/places/541052
Λακω]νικῆς	1	http://pleiades.stoa.org/places/570406
Κνωσὸν	1	http://pleiades.stoa.org/places/589872
Κασσάνδρεια	1	http://pleiades.stoa.org/places/491701
Γάζει	1	http://pleiades.stoa.org/places/687902
Κῶι	1	http://pleiades.stoa.org/places/599581
Χαλκίδα	1	http://pleiades.stoa.org/places/540703
Μίλητον	1	http://pleiades.stoa.org/places/599799
Μιτυλήνης	1	http://pleiades.stoa.org/places/550763
Ἑλλησπόντωι	1	http://pleiades.stoa.org/places/501434
Πλαταιαῖς	1	http://pleiades.stoa.org/places/541063
Συρίαν	1	http://pleiades.stoa.org/places/981550
Παρνασσὸν	1	http://pleiades.stoa.org/places/541012
Ἴδηι	1	http://pleiades.stoa.org/places/589816
Λ[υ]-[σι]μάχεια	1	http://pleiades.stoa.org/places/501458
Χαλκ[ί]-[δα	1	http://sws.geonames.org/260133
Ἔφεσον	1	http://pleiades.stoa.org/places/599612
Ἐρυθρὰς	1	http://pleiades.stoa.org/places/550535
Κλαζομενὰς	1	http://pleiades.stoa.org/places/550651
[Φώκ]α[ιαν]	1	http://pleiades.stoa.org/places/550823
Κορίνθου	1	http://pleiades.stoa.org/places/570182
Λυδ[ῶν	1	http://pleiades.stoa.org/places/991385
Μαραθῶνι	1	http://pleiades.stoa.org/places/580021
Μεγάλη πόλι[ς	1	http://pleiades.stoa.org/places/570467
Ἀλεξάνδρεια	1	http://pleiades.stoa.org/places/727070
Μέμφιν	1	http://pleiades.stoa.org/places/736963
Σικελίαι	1	http://pleiades.stoa.org/places/981549
[Π]ειραιᾶ	1	http://pleiades.stoa.org/places/580062
Κ[ελ]α[ι]ναῖ[ς	1	http://pleiades.stoa.org/places/638751
[Κ]ρ[ήτης]	1	http://pleiades.stoa.org/places/589748
Κυδω]νίαν	1	http://pleiades.stoa.org/places/589886
Ἀρκαδίαι	1	http://pleiades.stoa.org/places/570102
[Γέ]-[λ]αι	1	http://pleiades.stoa.org/places/462214
Ἤλιδ]ι	1	http://pleiades.stoa.org/places/570220
Σαλαμῖνα	1	http://pleiades.stoa.org/places/707617
[Πριήν]ην	1	http://pleiades.stoa.org/places/599905
[Λέβεδ]ον	1	http://pleiades.stoa.org/places/599754
Ἀσίας	1	http://pleiades.stoa.org/places/837
Π]ελασγι[κ]οῦ τείχους	1	http://dare.ht.lu.se/places/25113

Table 4.3 *continued*

|		
Ἄθω	1	http://pleiades.stoa.org/places/501365
Σαλαμῖνα	1	http://pleiades.stoa.org/places/580101
Κολωνοῦ	1	http://pleiades.stoa.org/places/582869
Κυζίκωι	1	http://pleiades.stoa.org/places/511218
Μουνυχίαν	1	http://pleiades.stoa.org/places/580029
Λίνδωι	1	http://pleiades.stoa.org/places/589913
Φρ[υγίας	1	http://pleiades.stoa.org/places/609502
[Μ]υοῦντα	1	http://pleiades.stoa.org/places/599813
Χίον	1	http://pleiades.stoa.org/places/550497
Αἰγίνηι	1	http://pleiades.stoa.org/places/579844
Κύρραν	1	http://pleiades.stoa.org/places/540868
Λεύκτροις	1	http://pleiades.stoa.org/places/540913
Γράνιχον	1	http://pleiades.stoa.org/places/511260
Ἰσσῶι	1	http://pleiades.stoa.org/places/658490
Ἄρβηλα	1	http://pleiades.stoa.org/places/874341
Τανάϊ	1	http://pleiades.stoa.org/places/825398
πόλις ἑλληνίς	1	http://pleiades.stoa.org/places/59672
τὸ ἱερὸν τὸ Καλχηδονίων	1	http://pleiades.stoa.org/places/520988

Figure 4.55. *Recogito*: map view of the *Marmor Parium* (empty Basemap)
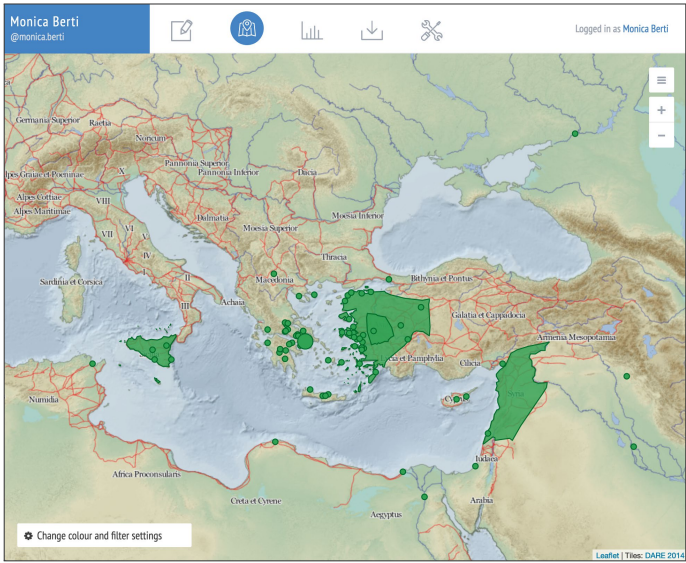
Figure 4.56. *Recogito*: map view of the *Marmor Parium* (Ancient Places map)
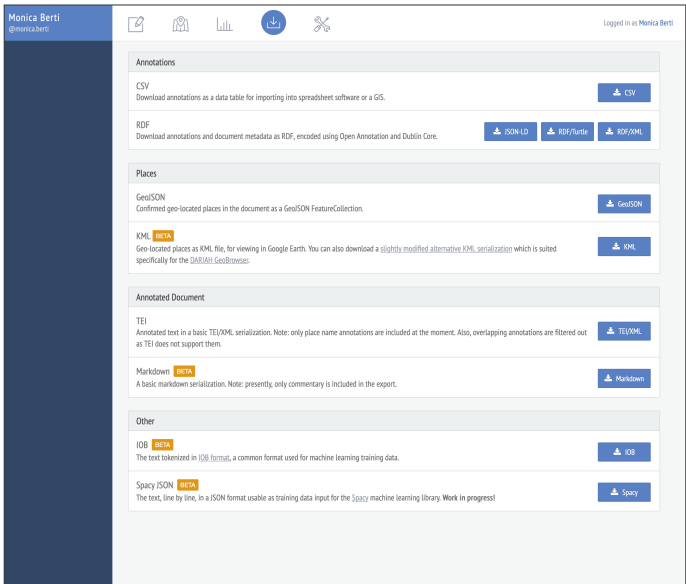

Figure 4.57. *Recogito*: download options for the *Marmor Parium*

Recogito provides also a *Map view* to visualize annotated places on different Base Maps: https://recogito.pelagios.org/document/uynxk84uyyizck/map. Empty Basemap (geographically accurate basemap of the ancient world by the *Ancient World Mapping Center*, University of North Carolina at Chapel Hill); Ancient Places (Roman Empire base map by the *Digital Atlas of the Roman Empire*, Lund University, Sweden); Modern Places (modern places and roads via *Open-StreetMap*); Aerial (aerial imagery via *Mapbox*). Figures 4.55 and 4.56 show annotated places of the *Marmor Parium* on an Empty Basemap and on an Ancient Places map of the *Digital Atlas of the Roman Empire.* In terms of data, *Recogito* allows users to download annotations and data to different formats, such as CSV, RDF (JSON-LD, RDF/Turtle, RDF/XML), GeoJSON, KML (beta), TEI/XML, Markdown (beta), IOB (beta), and Spacy JSON (beta) (fig. 4.57).

4.5.4 Onomastics and Prosopography of the Marmor Parium

The text of the *Marmor Parium* is a rich collection of personal names related to the events described in the chronicle. In order to get an estimate and on the basis of the edition of the *Inscriptiones Graecae* (XII 5, 444), names of kings, archons, and other people have been provisionally extracted from the *Marmor Parium* and listed according to their Latinized form.[318] These names are available in different sheets of the *DMP Chronological Table Google Drive* spreadsheet (p. 294). Tables 4.4, 4.5, and 4.6 show how 14 Athenian kings, 64 Athenian archons, and 193 other names are distributed in the text of the *Marmor Parium*:

Table 4.4. *Digital Marmor Parium:* Athenian kings

Cecrops	MP A1, 0
Cecrops	MP A1, 1
Cecrops	MP A1, 2
Cranaos	MP A1, 3
Cranaos	MP A1, 4
Amphictyon	MP A1, 5
Amphictyon	MP A1, 6
Amphictyon	MP A1, 7
Amphictyon	MP A1, 8
Erichthonios	MP A1, 9
Erichthonios	MP A1, 10

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318 For other readings of the text and a recent commentary, see Rotstein (2016). For lists and discussions about Athenian kings and archons, see Jacoby (1902), Cadoux (1948), Dinsmoor (1966), Develin (1989), Harding (2008).

Table 4.4 *continued*

Pandion	MP A1, 11
Erechtheus	MP A1, 12
Erechtheus	MP A1, 13
Erechtheus	MP A1, 14
Erechtheus	MP A1, 15
Pandion	MP A1, 16
Pandion	MP A1, 17
Aegeus	MP A1, 18
Aegeus	MP A1, 19
Theseus	MP A1, 20
Theseus	MP A1, 21
Theseus	MP A1, 22
Menestheus	MP A1, 23
Menestheus	MP A1, 24
Demophon	MP A1, 25
Demophon	MP A1, 26
Menestheus	MP A1, 27
Diognetos	MP A1, 29
Pherecles	MP A2, 30
Aischylos	MP A2, 31

Table 4.5. *Digital Marmor Parium*: Athenian archons

Diognetos	MA A1, 0
Lysiades	MP A2, 33
Dropides	MP A2, 34
Aristocles	MP A2, 35
Critias the first	MP A2, 36
Simon	MP A2, 37
Damasios the second	MP A2, 38
Comeus	MP A2, 40
Euthydemos	MP A2, 41
Harpactides	MP A2, 45
Lysagoras	MP A2, 46
Pythocritos	MP A2, 47
Phainippides the second	MP A2, 48
Aristeides	MP A2, 49
Philocrates	MP A2, 50
Kalliades	MP A2, 51

Table 4.5 *continued*

Xanthippos	MP A2, 52
Timosthenes	MP A2, 53
Adeimantos	MP A2, 54
Chares	MP A2, 55
Apsephion	MP A2, 56
Theagenides	MP A2, 57
Euthippos	MP A2, 58
Callias the first	MP A2, 59
Diphilos	MP A2, 60
Astyphilos	MP A2, 61
Euctemon	MP A2, 62
Antigenes	MP A2, 63
Callias the first	MP A2, 64
Mikon	MP A2, 65
Laches	MP A2, 66
Aristocrates	MP A2, 67
Pytheus	MP A2, 69
Callias	MP A2, 70
Asteios	MP A2, 71
Phrasicleides	MP A2, 72
Nausigenes	MP A2, 74
Cephisodoros	MP A2, 75
Agathocles	MP A2, 78
Callistrates	MP A2, 79
Pythodelos	MP B, 1
Euainetos	MP B, 2
Ctesicles	MP B, 3
Nicocrates	MP B, 4
Niketos	MP B, 5
Aristophon	MP B, 6
Euthycrites	MP B, 7
Hegesios	MP B, 8
Cephisodoros	MP B, 9
Philocles	MP B, 10
Archippos	MP B, 11
Apollodoros	MP B, 12
Demogenes	MP B, 13
Democleides	MP B, 14
Theophrastos	MP B, 15

Table 4.5 *continued*

Polemon	MP B, 16
Simonides	MP B, 17
Hieromnemon	MP B, 18
Demetrios	MP B, 19
Cairimos	MP B, 20
Anaxicrates	MP B, 21
Coroibos	MP B, 22
Euxenippos	MP B, 23
Pherecles	MP B, 24
Leostratos	MP B, 25
Nicocles	MP B, 26
Euctemon	MP B, 27

Table 4.6. *Digital Marmor Parium*: personal names

-uanax	MP A1, 0
Aktaios	MP A1, 1
Deucalion	MP A1, 2
Ares	MP A1, 3
Poseidon	MP A1, 3
Halirrhothios	MP A1, 3
Deucalion	MP A1, 4
Amphictyon	MP A1, 5
Hellen	MP A1, 6
Cadmos	MP A1, 7
Danaos	MP A1, 9
Danaides	MP A1, 9
Helike	MP A1, 9
Archedike	MP A1, 9
Hyagnis	MP A1, 10
Minos	MP A1, 11
Kelmios	MP A1, 11
Damnameneus	MP A1, 11
Demeter	MP A1, 12
Triptolemos	MP A1, 12
Celeus	MP A1, 12
Neaira	MP A1, 12
Triptolemos	MP A1, 13
Orpheus	MP A1, 14

Table 4.6 *continued*

Kore	MP A1, 14
Demeter	MP A1, 14
Eumolpos	MP A1, 15
the father of Mousaios	MP A1, 15
Mousaios	MP A1, 15
Lycaon	MP A1, 17
Heracles	MP A1, 18
Apollo	MP A1, 19
Minos	MP A1, 19
Sinis	MP A1, 20
Amazons	MP A1, 21
Adrastos	MP A1, 21
Archemoros?	MP A1, 21
Orestes	MP A1, 25
Agamemnon	MP A1, 25
Aegisthus	MP A1, 25
Erigone	MP A1, 25
Clytaemnestra	MP A1, 25
Teucros	MP A1, 26
Neleus	MP A1, 27
Hesiod	MP A1, 28
Homer	MP A1, 28
Pheidon the Argive	MP A2, 30
Heracles	MP A2, 30
Archias	MP A2, 31
Euagetus	MP A2, 31
Temenos	MP A2, 31
Archilochos?	MP A2, 33
Terpander son of Derdenes	MP A2, 34
Derdenes	MP A2, 34
Alyattes	MP A2, 35
Sappho	MP A2, 36
Sousarion	MP A2, 39
Peisistratos	MP A2, 40
Croesus	MP A2, 41
Cyrus	MP A2, 42
Croesus	MP A2, 42
Hipponax	MP A2, 42
Thespis	MP A2, 43

Table 4.6 *continued*

Darius	MP A2, 44
Harmodios	MP A2, 45
Aristogeiton	MP A2, 45
Hipparchos	MP A2, 45
Peisistratos	MP A2, 45
Hypodikos	MP A2, 46
Melanippides	MP A2, 47
Artaphernes	MP A2, 48
Darius	MP A2, 48
Datis	MP A2, 48
Aeschylus	MP A2, 48
Simonides	MP A2, 49
Simonides	MP A2, 49
Darius	MP A2, 49
Xerxes	MP A2, 49
Aeschylus	MP A2, 50
Euripides	MP A2, 50
Stesichoros	MP A2, 50
Xerxes	MP A2, 51
Mardonios	MP A2, 52
Xerxes	MP A2, 52
Gelon	MP A2, 53
Deinomenes	MP A2, 53
Simonides	MP A2, 54
Leoprepes	MP A2, 54
Harmodios	MP A2, 54
Aristogeiton	MP A2, 54
Hieron	MP A2, 55
Epicharmos	MP A2, 55
Sophocles	MP A2, 56
Sophillos	MP A2, 56
Simonides	MP A2, 57
Alexander	MP A2, 58
Perdiccas	MP A2, 58
Aeschylus	MP A2, 59
Euripides	MP A2, 60
Socrates	MP A2, 60
Anaxagoras	MP A2, 60
Archelaos	MP A2, 61

Table 4.6 *continued*

Perdiccas	MP A2, 61
Dionysios	MP A2, 62
Euripides	MP A2, 63
Sophocles	MP A2, 64
Cyrus	MP A2, 64
Telestes	MP A2, 65
Cyrus	MP A2, 66
Socrates	MP A2, 66
Aristonous	MP A2, 67
Polyidos	MP A2, 68
Philoxenos	MP A2, 69
Anaxandrides	MP A2, 70
Astydamas	MP A2, 71
Amyntas	MP A2, 72
Alexander	MP A2, 72
Stesichoros	MP A2, 73
Dionysios	MP A2, 74
Dionysios	MP A2, 74
Alexander	MP A2, 74
Perdiccas	MP A2, 74
Amyntas	MP A2, 74
Timotheos	MP A2, 76
Philip	MP A2, 77
Amyntas	MP A2, 77
Artaxerxes	MP A2, 77
Ochos	MP A2, 77
Philip	MP B, 1
Alexander	MP B, 1
Alexander	MP B, 2
Alexander	MP B, 3
Darius	MP B, 3
Alexander	MP B, 4
Alexander	MP B, 5
Darius	MP B, 5
Kallippos	MP B, 6
Alexander	MP B, 6
Darius	MP B, 6
Bessus	MP B, 6
Philemon	MP B, 7

Table 4.6 *continued*

Alexander	MP B, 8
Ptolemy	MP B, 8
Antipatros	MP B, 9
Antipatros	MP B, 10
Ophelas	MP B, 10
Ptolemy	MP B, 10
Antigonos	MP B, 11
Alexander	MP B, 11
Perdiccas	MP B, 11
Crateros	MP B, 11
Aristotle	MP B, 11
Ptolemy	MP B, 11
Antipatros	MP B, 12
Cassandros	MP B, 12
Aridaios	MP B, 12
Ptolemy	MP B, 12
Agathocles	MP B, 13
Kleitos	MP B, 13
Nikanor	MP B, 13
Demetrius	MP B, 13
Cassandros	MP B, 14
Olympias	MP B, 14
Agathocles	MP B, 14
Menandros	MP B, 14
Sosiphanes	MP B, 15
Ptolmey	MP B, 16
Demetrios	MP B, 16
Seleucos	MP B, 16
Nicocreon	MP B, 17
Ptolemy	MP B, 17
Alexander	MP B, 18
Alexander	MP B, 18
Artabazos	MP B, 18
Heracles	MP B, 18
Agathocles	MP B, 18
Ophelas	MP B, 19
Ptolemy	MP B, 19
Cleopatra	MP B, 19
Demetrius	MP B, 20

Table 4.6 *continued*

Antigonos	MP B, 20
Demetrius Phalereus	MP B, 20
Demetrius	MP B, 21
Phila	MP B, 21
Sosiphanes	MP B, 22
Ptolemy	MP B, 23
Demetrius	MP B, 24
Lysimachos	MP B, 25
Cassandros	MP B, 26
Demetrios	MP B, 26
Demetrius	MP B, 27
Cassandros	MP B, 27
Ptolemy	MP B, 27

As described in section 4.5.2 concerning the EpiDoc Guidelines, personal names can be encoded in XML with elements and attributes that specify roles and point to external authority lists. As for geographical terms, it is also possible to annotate personal entities outside of the XML file adopting ontologies for representing relationships ad prosopographies.

In this regard, the *Standards for Networking Ancient Prosopographies* (SNAP:DRGN) project is using *Linked Open Data* (LOD) to build a virtual authority list for ancient people through aggregation of common information from collaborating projects: "A unified authority of ancient persons will serve as a convenient and powerful single resource for prosopographers, text editors and scholars to use for disambiguating person references by means of annotations that record the specific URI of a person identified by the SNAP graph. The graph will provide: 1) identifiers for all persons who appear in one or more corpora and catalogues; 2) gold standard normalization data for parsing and proofing tools; 3) visualization of ancient persons, names, titles and relationships; 4) research tools for historians; 5) standards and software contributing to the Linked Ancient World Data community."[319]

As stated by the editors of the project, the goal is not to produce new universal datasets of historical persons, but create "single entry point — and related identifier — coupled with a small subset of common fields made available both to human researchers and for automated processing," in order to facilitate "interop-

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[319] The quotation is from the website of the SNAP:DRGN project, about which see Bodard/Gheldof et al. (2016) (Paper 1. *Networking Ancient Person-data: community building and user studies around the SNAP:DRGN project*) and Bodard/Cayless et al. (2017). On *Linked Ancient World Data*, see Cayless (2019).

erability and interchange, exploitation and discovery through common metadata, and the recording of both known and newly discovered relationships between person records. Users will be enabled and encouraged to (a) annotate their data with SNAP URIs to disambiguate person references, and (b) add structured commentary to the SNAP graph in the form of scholarly assertions, bibliography and apparatus." (Bodard/Gheldof et al. (2016) 44).

The model of SNAP is based on a simple structure that uses Web and LOD technologies to represent relations between databases and link references in primary sources to authority lists of persons and names. The core of the project is based on three large historical prosopographies and onomastica from the ancient world: 1) the *Lexicon of Greek Personal Names*, 2) *Trismegistos*, and 3) *Prosopographia Imperii Romani*. SNAP:DRGN is an ongoing project and the *SNAP Cookbook* is the result of discussions and meetings concerning the complexities of prosopographical materials, in order to "set out details of several scenarios for the encoding, publication and linking of ancient person data in RDF, and connecting them to the SNAP graph." (Bodard/Gheldof et al. (2016) 45).

As far as the *Digital Marmor Parium* project is concerned, the first step is to annotate and lemmatize the names listed above in the original language and in different editions according to standards and practices of Named Entity Recognition, and cite them with identifiers of the LGPN database.[320] Through these identifiers, entities of the *Digital Marmor Parium* project will be part of the SNAP graph and linked to other resources.

4.5.5 The Chronology of the Marmor Parium

As described in sections 4.5.1 and 4.5.2, the *Marmor Parium* is a selection of events whose chronology is expressed with numbers of years elapsing from 264/63 BC and with eponymous kings and archons. This data is encoded according to the EpiDoc Guidelines as part of the *Digital Marmor Parium* project. A comprehensive view of the chronology of the *Marmor Parium* is available through the *DMP Chronological Table Google Drive* spreadsheet (fig. 4.58).[321]
This table is based on the text of IG XII 5, 444 and compares chronologies of the *Marmor Parium* in the form of Gregorian calendars as they have been interpreted and published in the editions of the FGrHist and the IG.[322]

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320 On NER for ancient Greek and on the use of the LGPN database in the *Digital Athenaeus* project, see section 5.6.

321 The *Google Drive* Spreadsheet is available at https://bit.ly/2TdSRQ3 (*view only*).

322 Events are arranged as A(a) 0–29, A(b) 30–80, and B 1–27. As mentioned in the previous section, the table includes also sheets with the names of the Athenian kings, Athenian archons, and other people mentioned in the inscription.

Figure 4.58. *Digital Marmor Parium*: chronological table

As for geographical and personal data, also chronological data can be annotated and visualized externally. A possibility for the future is to represent chronological data with *Graph of Dated Objects and Texts* (GODOT), which is a graph database system that aims at creating and maintaining a gazetteer of calendar dates in different calendar systems, initially those used in Greek and Roman antiquity across the Mediterranean area, and provide links to attestations of these dates in online editions.[323] This possibility and related issues were discussed on the occasion of the *Epigraphy Edit-a-thon: Editing Chronological and Geographic Data in Ancient Inscriptions*, that I organized at the Universität Leipzig in 2016, and will be part of future work of the *Digital Marmor Parium* project.[324]

As for now, an experiment has been conducted with *TimelineJS* to represent the Gregorian chronology of events and kingship of fragment A (ll. 1–45) of the *Marmor Parium* as listed in *Die Fragmente der griechischen Historiker* (fig. 4.59).[325]

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323 See https://godot.date/. See also *PeriodO*, which is a public domain gazetteer of scholarly definitions of historical, art–historical, and archaeological periods that eases the task of linking among datasets that define periods differently and also helps scholars and students see where period definitions overlap or diverge: https://perio.do. On these projects, see Grieshaber (2016), Rabinowitz/Shaw et al. (2018), and Grieshaber (2019).

324 Berti (2016a).

325 The timeline is available at http://www.digitalmarmorparium.org/chronology.html. The text of the visualization is based on the text of IG XII 5, 444. This experiment was performed by Stella Dee while working as a research fellow at the Alexander von Humboldt Chair of Digital Humanities at the University of Leipzig.

Figure 4.59. *Digital Marmor Parium*: *TimelineJS*

4.5.6 Linguistics of the Marmor Parium

Events in the Parian Marble are arranged in sections that are characterized by a very similar format and language. Experiments are currently being performed to annotate the morphology and the syntax of the inscription according to the guidelines of the *Ancient Greek Dependency Treebank 2.0*. Annotations of the first fifteen sections of the text have been produced by Giuseppe G.A. Celano at the University of Leipzig and can be visualized through the online editor *Arethusa* (fig. 4.60).[326] In this case, main peculiarities are due to the fact that the text is fragmentary and with gaps, and that the language depends on the epigraphical nature of the chronicle. Morpho-syntactic annotations of inscriptions are not yet part of the *Ancient Greek Dependency Treebank 2.0* guidelines, but they are a work in progress of the community and part of the *Digital Marmor Parium* project is to contribute to them in the future.[327]

4.5.7 Drawings and Images of the Marmor Parium

The surfaces of the surviving fragments of the *Marmor Parium* are unfortunately very damaged and it's now difficult to obtain better readings of the text than those already published.[328] Nevertheless, digital technologies may help scholars access the two documents and analyze them on the screen. This is the reason why the

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326 Celano (2019). Annotations are available at http://www.digitalmarmorparium.org/lingui stics.html. On *Arethusa*, see Almas (2017).

327 On epigraphic treebanks, see Dell'Oro/Celano (2019).

328 See Rotstein (2016) 17-20. On deep learning for epigraphy and on experiments with providing text restorations using deep neural networks, see Assael/Sommerschield et al. (2019) and https://github.com/sommerschield/ancient-text-restoration.
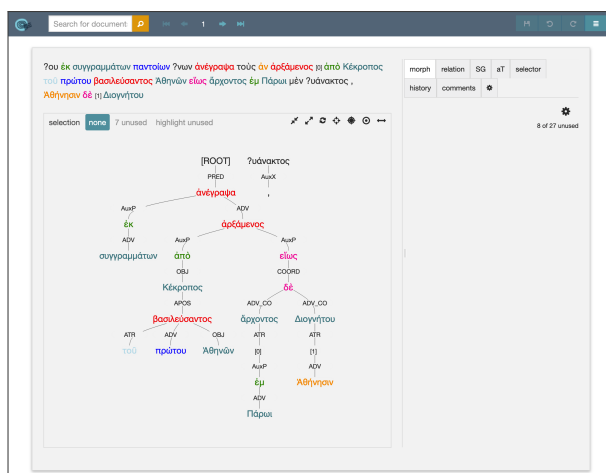
Figure 4.60. *Digital Marmor Parium*: linguistic annotation with *Arethusa*

Digital Marmor Parium project is collecting drawings and images of the stone.[329]
As of 2021, the *Marmor Parium* can be visualized through the following draw-
ings made by the first editors of the inscription and available through the *Digital
Marmor Parium* website:
- Fragment A (ll. 1–45): IG XII 5, 444, 101 (fig. 4.47); Jacoby (1904), Beilage I
- Fragment A (ll. 46–93): IG XII 5, 444, 102 (fig. 4.48); Jacoby (1904), Beilage
  II
- Fragment B (ll. 1–34): Krispi/Wilhelm (1897), Tafel XIV; IG XII 5, 444, 103
  (fig. 4.49); Jacoby (1904), Beilage III

Images of the *Marmor Parium* are currently available thanks to the Ashmolean
Museum of the University of Oxford and through *Wikimedia*:[330]
- Fragment A (ll. 46–93): Fragment A (1) (courtesy of the Ashmolean Mu-
  seum, Oxford); Fragment A (2) (courtesy of the Ashmolean Museum, Ox-
  ford); Fragment A (*Wikimedia*)
- Fragment B: Fragment B (*Wikimedia*)

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329 Data is available at http://www.digitalmarmorparium.org/images.html.
330 I'm very grateful to the Ashmolean Museum of the University of Oxford for providing
     me with images and RTI scans of fragment A of the Parian Marble (see section 4.5.8) and
     in particular to Charles Crowther for welcoming me during a visit to the Museum in the
     Spring 2015 on the occasion of a presentation of the *Digital Marmor Parium* project that
     I gave for the *Oxford Ancient History Seminar on Digital Classics* (see p. 268 n. 288). For
     metadata see *DBPedia*: http://dbpedia.org/page/Parian_Chronicle. On the use of *Wikipedia*
     and *Wikimedia* in the humanities and for historical documents, see Wozniak/Nemitz et al.
     (2015).

A first visit to the Archaeological Museum of Paros in the Summer 2015 allowed me to inspect fragment B of the *Marmor Parium* and plan a future visit in order to take high resolution pictures of the stone.[331] Drawings and images will be used in the future not only for a better reading of the inscription, but also for their annotation and alignment with transcriptions of the text.[332]

Figure 4.61. *Digital Marmor Parium*: RTI scan (courtesy of the Ashmolean Museum, Oxford)

4.5.8 RTI Scans of the Marmor Parium

The *Reflectance Transformation Imaging* (RTI) technique has been used to scan the surface of fragment A of the Parian Marble preserved in the Ashomolean Museum of the University of Oxford.[333] I'm very grateful to Charles Crowther, Lindsay MacDonald, and Nick Pollard for providing me with the RTI scans that are available through the *Digital Marmor Parium* website. RTI scans have been processed in order to be visualized in HTML pages of the *Digital Marmor Parium* project using the WebRTIViewer (fig. 4.61).

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331 I'm very grateful to Yannos Kourayos, Director of the Archaeological Musem of Paros, for facilitating my autopsy of fragment B of the Parian Marble during my visit to Paros.

332 In this respect, the model is the *Homer Multitext* project of the Center for Hellenic Studies. For experiments and projects with students, annotations of images are now possible through the platform *Recogito*: on the platform and for tutorials, see p. 277.

333 On this technique, see https://en.wikipedia.org/wiki/Polynomial_texture_mapping. For more information, see the RTI page of *Cultural Heritage Imaging* (CHI): http://culturalheritageimaging.org/Technologies/RTI/.

4.6 Digital Rosetta Stone

After the edition and the commentary to the Parian Marble, the first volume of the *Fragmenta Historicorum Graecorum* prints also the Greek text of the Rosetta Stone (*Marmor Rosettanum*) with a French literal translation and a commentary by Jean-Antoine Letronne (see p. 129).

The inscription is part of the DFHG database, is accessible through the slide in/out navigation menu of the main page, and is provided with the URN `urn:lofts:fhg.1.marmor_rosettanum`. The online version follows the structure of the printed edition.[334] After the *Avertissement*, there are 54 lines (*lignes*) with the Greek text, the French translation, and the corresponding commentary (*commentaire critique, historique et archéologique*). Each line of the *Marmor Rosettanum* is aligned with the translation and the commentary, is linked to the entries of the FHG *Index Marmoris Rosettani*, and the Greek text can be automatically parsed with the *OpenNLP POSTagger for Ancient Greek*.[335] As for the *Digital Marmor Parium*, the DFHG has started a separate project to experiment with the analysis and the representation of the Rosetta Stone in a digital environment. The description of this project is out of the scope of this book and I provide here only a very short introductory presentation of it.

The *Digital Rosetta Stone* (*Der Stein von Rosette digital*) is a project developed in collaboration with the Institute of Egyptology at the University of Lepzig for producing a digital edition of the Rosetta Stone with textual alignment, translation alignment, and morpho-syntactic annotation of the three scripts of the stone (fig. 4.62).[336] This initiative started thanks to the support of *StiL* (*Studieren in Leipzig*), which is a project of the University of Leipzig developed in the frame of the *Bund-Länder-Programms "Qualitätspakt Lehre"* supported by the German Federal Ministry of Education and Research (BMBF). The *Digital Rosetta Stone* was financed as part of the *7. Projektkohorte der LaborUniversität* for the academic year 2017/2018 with an extension to the academic year 2019/2020. This project was also one of the reasons why Franziska Naether and I were awarded the *Theodor-Litt-Preis 2018* of the University of Leipzig.

The main goal of the project was to integrate research on the Rosetta Stone into the teaching activites of the courses in Digital Humanities, Digital Philology,

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334 For a detailed description of the DFHG content, see section 4.3.1.

335 On the integration of the DFHG with the *OpenNLP POSTagger for Ancient Greek*, see p. 165.

336 See http://rosetta-stone.dh.uni-leipzig.de. For a description of the project, see Berti/Jushaninowa et al. (2016), Berti/Naether/Amin et al. (2018a), Berti/Naether/Amin et al. (2018b), Berti/Naether/Bozia (2018), Amin/Barmpoutis et al. (forthcoming). The project collaborated also with *The Rosetta Stone Online* developed as a cooperation of the German Excellence Cluster Topoi and the Department of Archaeology of the Humboldt-Universität zu Berlin: http://rosettastone.hieroglyphic-texts.net.

Egyptology meets Computer Science : The Digital Rosetta Stone Project

https://rosetta-stone.dh.uni-leipzig.de

Team: M. Amin (M. Eng.), Dr. M. Berti, J. Hensel (M. A.), Dr. F. Naether

Wer sind wir?

„The Digital Rosetta Stone" ist ein Verbundprojekt des Ägyptologischen Instituts und des Lehrstuhls für Digital Humanities an der Universität Leipzig. Gefördert wird das Vorhaben als Lehr-Lernprojekt durch das Bundesministerium für Bildung und Forschung im Rahmen von „StiL – Studieren in Leipzig". Als Kooperationspartner fungieren die Humboldt-Universität zu Berlin sowie das British Museum in London.

Im Fokus stehen einerseits die Sprachen des Steins von Rosette (Hieroglyphisch, Demotisch und Altgriechisch) und andererseits sein Textinhalt. Als Lehr-Lern-Projekt ist damit ein didaktischer Hintergrund verknüpft – nämlich der Erwerb von Textkompetenz, d. h.:

- Sprachkompetenz (Vokabular, Grammatik, Syntax; Interlinearglossierung)
- Wissensaktivierung (Abruf, Vertiefung, Erweiterung)
- Texttransformation (Interpretation des Inhaltes durch komplexe Sinnstrukturen)
- Textkritik (wissenschaftlicher Umgang mit Textübersetzungen).

Verschiedene Werkzeuge aus dem Bereich der Digital Humanities sollen diesen Prozess unterstützen:

- Erlernen der Sprache: Alignment
- Morpho-syntaktische Strukturen (Textkomposition): Treebanking
- Darstellen von Schrift ohne Unicode: Bildverknüpfung.

Ziel ist eine digitale Textedition, die die Methoden aus der Ägyptologie, der Klassischen Philologie und der Digital Humanities miteinander verknüpft. Laufzeit: 01.10.2017–30.09.2018.

Was ist textual Alignment?

Vorarbeiten: Der griechische Texte der Rosettana ist im Rahmen der *Leipzig Open Fragmentary Texts Series* (LOFTS) übersetzt und annotiert worden. Für den hieroglyphischen Teil wurde ein Test-Alignment mit dem Tool *Alpheios* (https://alpheios.net/) erstellt.

Das Alignment stellt eine Wort-Verknüpfung dar, die den Erwerb einer Sprache und den Sprachvergleich digital unterstützt. Im Projekt ist dafür die von **Tariq Yousef** entwickelte Software *Ugarit iAligner* (http://ugarit.ialigner.com/index.php) verwendet worden.

Abb. 1: Alignment Demotisch – Deutsch.

Das Programm bietet die Möglichkeit, bis zu drei Sprachen miteinander zu vergleichen. Die sich entsprechenden Wörter werden per Mausklick ausgewählt und miteinander verknüpft. Abb. 1 veranschaulicht diese Wortverknüpfung am Beispiel §39 (= Zeile 25) des demotischen Textes der Rosettana. Es kommen 1:1, 1:n, n:1 und n:n Beziehungen zwischen den Sprachen vor.

Die drei Schriftsprachen des Dekretes sind jeweils einzeln mit dem *iAligner* bearbeitet worden. Dafür ist im Vorfeld jeder Textteil satzweise zerlegt worden. Um die drei Sprachen zu vergleichen, die jeweils den gleichen Text wiedergeben, ist im Rahmen des Projektes eine Synopse erstellt worden. Diese diente als Grundlage für ein zweites Alignment, das sich entsprechende Satzteile in den Blick nimmt (Abb. 2).

Abb. 2: Alignment Hieroglyphisch – Demotisch – Griechisch.

Was ist die Rosettana?

Der Stein von Rosette ist ein Synodaldekret aus der Regierungszeit Ptolemaios V. Epiphanes (204-180 v. Chr.) und wurde am 27. März 196 v. Chr. aufgesetzt. Das Dekret ist in drei Schriftsprachen abgefasst: Hieroglyphisch (x+14 Zeilen, 707 Wörter), Demotisch (32 Zeilen, 2305 Wörter) und Altgriechisch (54 Zeilen, 1505 Wörter).

Der Stein ist ein Granodiorit, wiegt 762 kg und ist heute 114,4 cm hoch, 72,3 cm breit und 27,93 cm stark. Ursprünglich war der Stein ca. 150 cm hoch. Der obere Teil sowie die rechte untere Ecke sind abgebrochen.

Das Artefakt wurde während der Expedition Napoleons 1798/99 in der ägyptischen Hafenstadt el-Rashid entdeckt und befindet sich heute in London im British Museum (Inv.-Nr. EA 24). Es ist eines der berühmtesten Altertümer. Seine Bedeutung wird jedoch meist auf den Durchbruch innerhalb der Entzifferungsgeschichte der Hieroglyphen beschränkt. 1822 arbeitete J.-F. Champollion (1790-1832; Abb. 5) dieses Schriftsystem anhand der Rosettana und einer Obeliskeninschrift aus und teilte dies in einem Brief an Bon-Joseph Dacier mit (Abb. 6).

Abb. 5: J.-F. Champollion, Porträt v. Léon Cogniet (© Joconde database: entry 000PE000522).

Abb. 6: Champollion 1822: *Lettre à M. Dacier*, pl. IV.

Was steht drin?

Die Beschlüsse der Priestersynode anlässlich der Krönung Ptolemaios' V. in Memphis beinhalten: Steuererleichterungen, Zugeständnisse an die Priesterschaft, Amnestie für Inhaftierte, Bestätigung von Tempelbesitz, wirtschaftliche Vergünstigungen, Niederschlagung von innerägyptischen Aufständen, Hinrichtung der Rebellen, Steuererlass, Sorge um Tierkult und Tempelausstattung seitens des Königs. Darüber hinaus wurden dem König und seinen Ahnen Ehren zuteil (Statue, Kult, Feste) und den Priestern ein neuer Titel verliehen.

Wie wird visualisiert?

Da es für das Hieroglyphische und das Demotische noch kein Unicode gibt, sind für ihre Darstellung Fotos notwendig. Bei der Bildverknüpfung, basierend auf der Berechnung von Vektoren, können die Textdaten des Alignments mit der Schrift auf dem Foto verlinkt werden. Im Endergebnis ist auf dem Foto der Rosettana jeder zugewiesene Satz farblich markiert (Abb. 3).

Abb. 3: Visualisierung zu §39 (Quirke/Andrews 1988: *The Rosetta Stone Facsimile Drawing*).

Was ist Treebanking?

Die im Projekt gesammelten Daten und Annotationen zur Grammatik und Syntax der drei Texte sollen mit Hilfe des Treebanking-Verfahrens optisch abgebildet werden. Testweise ist dies mit dem griechischen Text im Tool *Arethusa* (http://www.perseids.org) zuvor versucht worden: Die Syntax wird als Baumstruktur ausgegeben. Weiterhin können zu den Wörtern grammatische und morphologische Informationen abgerufen werden. Diese entstammen der Glossierung des Textes. Für das Treebanking der beiden ägyptischen Texte besteht eine Kooperation mit dem Berliner Projekt *The Rosetta Stone Online*, in dem die Texte bereits codiert worden sind.
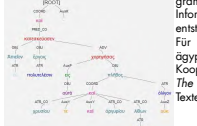
Abb. 4: Satzstruktur der griech. Texts, Zeile 33-34.

Figure 4.62. *Digital Rosetta Stone*: Berti/Naether/Amin et al. (2018b)

Figure 4.63. London, British Museum: Rosetta Stone (photo: M. Berti)

Figure 4.64. London, British Museum: Rosetta Stone (photo: M. Berti)
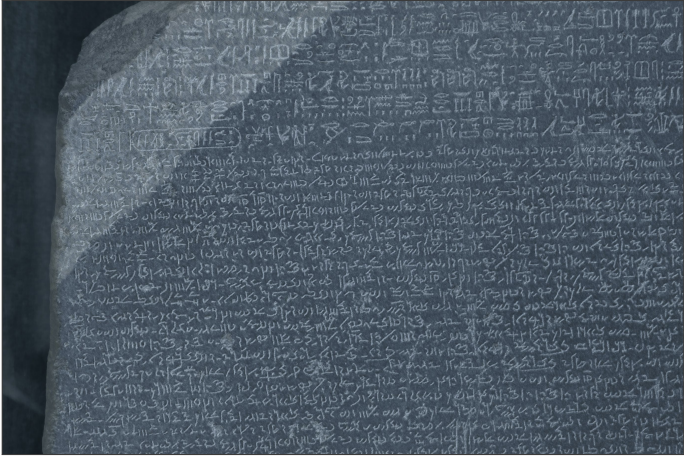
Figure 4.65. Rosetta Stone: left upper part (photo: A. Barmpoutis)
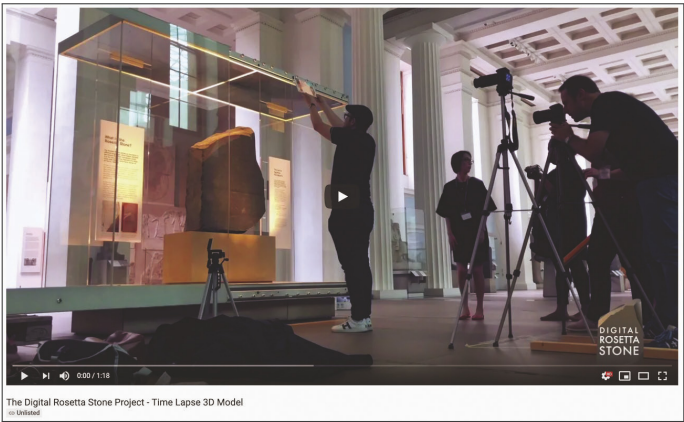
Figure 4.66. London, British Museum: time-lapse 3D model of the Rosetta Stone

and Egyptology that are taught at the University of Leipzig by Franziska Naether and myself. The result was the collaboration between a graduate student of Digital Humanities and Linguistics (Miriam Amin) and a PhD candidate of Egyptology (Josephine Ensel), who produced digital data on the Rosetta Stone. The work consisted in a complete new transcription of the text, in the alignment of the Hieroglyphic, Demotic, and Greek versions of it, and in the alignment with the German translation of the inscription originally provided by Heinz-Josef Thissen.[337] The alignment was produced with the web-based platform *Ugarit iAligner* and the result has been aligned with a new high-resolution picture of the stone.

The project produced also the complete morpho-syntactic annotation of the Greek version of the inscription according to the *Ancient Greek Dependency Treebank 2.0*, and work is in progress to expand the annotation to the Egyptian versions of the text and provide a tagset.

Part of the project has been also devoted to take new high resolution pictures of the Rosetta Stone. This task was accomplished thanks to the collaboration with the British Museum of London and with the *Digital Epigraphy and Archaeology Project* at the University of Florida.[338] Even if the inscription is one of the most famous objects from antiquity, high resolution pictures were still missing in order to obtain a better reading of the three scripts, and especially of the Hieroglyphic and Demotic sections. On June 28, 2018, 191 pictures of the stone were taken with quadri-directional lighting (figg. 4.63 and 4.64).[339] It was employed a shape-from-shading technique to highlight the text and reconstruct in 3D the shape of the inscribed surface.[340] The goal is to provide a deep reconstruction of the stone. Figure 4.65 shows an experiment with the left upper part of the Rosetta Stone, which is one of the most difficult areas of the inscription. Work is in progress for combining the pictures and provide the community with the final result.

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337 The Hieroglyphic and Demotic versions are reprensented in transliteration, given that complete Unicode is not available.

338 The project is very grateful to Ilona Regulski for facilitating the access to the Rosetta Stone in the British Museum and to Angelos Barmpoutis and Elena Bozia for providing the equipment and taking the pictures.

339 Two time-lapse videos of the working session in the British Museum are available on YouTube: see https://youtu.be/s0OboUFtNTw and https://youtu.be/of7vVcp3tCk (fig. 4.66).

340 On this technique, see Barmpoutis/Bozia et al. (2010).

5 Digital Athenaeus

This chapter describes the *Digital Athenaeus*, which is a project that provides an inventory of authors and works cited in the *Deipnosophists* of Athenaeus of Naucratis and implements a data model for identifying, analyzing, and citing uniquely instances of text reuse. The first section (5.1) describes characteristics of the *Deipnosophists* of Athenaeus and its role as a cover-text of many citations of Classical authors. The second section (5.2) introduces the *Digital Athenaeus* project. The third section (5.3) describes editions of the *Deipnosophists* that are currently available in a digital format and how the Greek text of this work can be accessed (5.3.1) and searched (5.3.2) in the *Digital Athenaeus* project. The fourth section (5.4) describes data citation applied to the text of the *Deipnosophists* and two resources that have been created as part of the project: the *Casaubon-Kaibel Reference Converter* (5.4.1) and the *CTS URN Retriever* (5.4.2). The fifth section (5.5) describes the production of the digital version of four indices of the *Deipnosphists* (5.5.1, 5.5.2, 5.5.3, 5.5.4) and their alignment with the Greek text in order to map their entries on to the text of Athenaeus (5.5.5 and 5.5.6). The sixth section (5.6) describes Named Entity Recognition applied to the text of the *Deipnosophists*, the production of a digger (5.6.1) and a concordance (5.6.2) to access named entities in Athenaeus, and methods for their annotations (5.6.3).

5.1 The Deipnosophists as a Cover-Text

The *Deipnosophists* of Athenaeus of Naucratis is not only an erudite and literary encyclopedia of a myriad of curiosities about classical antiquity, but also an invaluable collection of quotations of ancient authors, ranging from Homer to tragic and comic poets and lost historians.[1] Since the large majority of the works cited by Athenaeus is nowadays lost, this compilation is a sort of reference tool

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1   Athenaeus of Naucratis is almost unknown. The Byzantine lexicon *Suda* (A 731, s.v. Ἀθή-
     ναιος) describes him as coming from the Egyptian city of Naucratis, being a grammarian,
     and living in the time of the emperor Marcus Aurelius. Athenaeus presents himself as par-
     ticipating in the banquets described in the *Deipnosophists* with other twenty-two sophists
     (cf. section 5.5.3). He offers the account of the conversations to his friend Timocrates.

for every scholar of Greek theatre, poetry, historiography, botany, zoology, and many other topics.[2] The text has been transmitted in two different forms: 1) a 10th century mutilated copy of the original work (*Marcianus Graecus* 447), where the first part of the text until the third book (*Deipn.* 73e = 3.4) and other scattered folios are lost; 2) an epitome of the whole work in four copies (*Parisinus Suppl. Gr.* 841; *Laurentianus* LX.2; *BM Bibl. Regia* 16.D.X; *Erbacensis* 4).[3]

Figure 5.1 shows folio 124 (*verso*) of the main manuscript of the *Deipnosophists*, which is preserved in the Biblioteca Nazionale Marciana of Venice (*Marc. Gr.* 447).[4] The image shows one of the peculiarities of the manuscript, which is enriched with *marginalia* constituted by *scholia*, *lemmata*, and notes.[5] In this case margins include the following *lemmata* and notes that concern authors and topics cited by Athenaeus in a passage of the seventh book about the cuttlefish, the squid, and red mullets (*Deipn.* 324a–f = 7.124–125):[6] Ἱππῶναξ (324a), ἐξήγησις Ἱππώνακτος (324a), Ἐρασίστρατος (324a), Γλαῦκος (324a), Ἀρχέστρατος (324b), Ἀριστοφάνης (324b), Ἄλεξις (324b), περὶ τρίγλης καὶ κίχλης (324c), ὅτι εἰκὸς τὴν τρίγλη‹ν› διὰ τὸ τρὶς τίκτειν οὕτως κεκλῆσθαι (324d), and ὅτι κυφὰς αὐτὰς Ἐπίχαρμος καλεῖ (324e). The *marginalia in Athenaeum* are a rich collection of ancient annotations to the text of the *Deipnosophists*, that show and confirm the importance of this work as a "cover-text" of a huge mine of quotations and text reuses of Classical authors.[7]

The *Index Scriptorum* of the edition of the *Deipnosophists* by Georg Kaibel lists 809 entries, while the index of authors (*repertorio degli autori e dei luoghi citati*) of the edition of the *Deipnosophists* by Luciano Canfora lists 897 entries.[8] In order to estimate a proportion of the number of authors cited by Athenaeus, the online *Canon* of the *Thesaurus Linguae Graecae* (2019) includes ca. 1,700 authors for the period of time between the 8th century BC and the 3rd century CE, and a total of ca. 3,300 authors up to the 20th century and including *varia* and *incerta*.[9] Morevoer, citations in Athenaeus are precise and structured because they contain references to author names (often with additional elements about geographical

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2 Zecchini (1989); Braund/Wilkins (2000); Jacob (2001); Jacob (2004); Lenfant (2007a); Jacob (2013); Gorman/Gorman (2014) (chapters 3 and 4); Berti/Blackwell et al. (2016); Jacob (2018) 155–194 and 283–303.

3 For a detailed description of the manuscript tradition of the *Deipnosophists* (including copies of the *Marcianus* and other lost manuscripts) and of its early editions, see Arnott (2000).

4 This image is a portion of folio 124 of the *Marcianus Graecus* 447, whose digital pictures have been taken by the Biblioteca Nazionale Marciana and acquired by the *Digital Athenaeus* project for research purposes.

5 For a critical edition of the *marginalia* of the *Marcianus* manuscript, see Cipolla (2015).

6 Cipolla (2015) 91–92.

7 On the concept of "cover-text", see section 2.3.

8 Kaibel (1887–1890), vol. III 565–676; Canfora (2001), vol. IV 1885–1981.

9 On the TLG *Canon*, see pp. 18 ff.
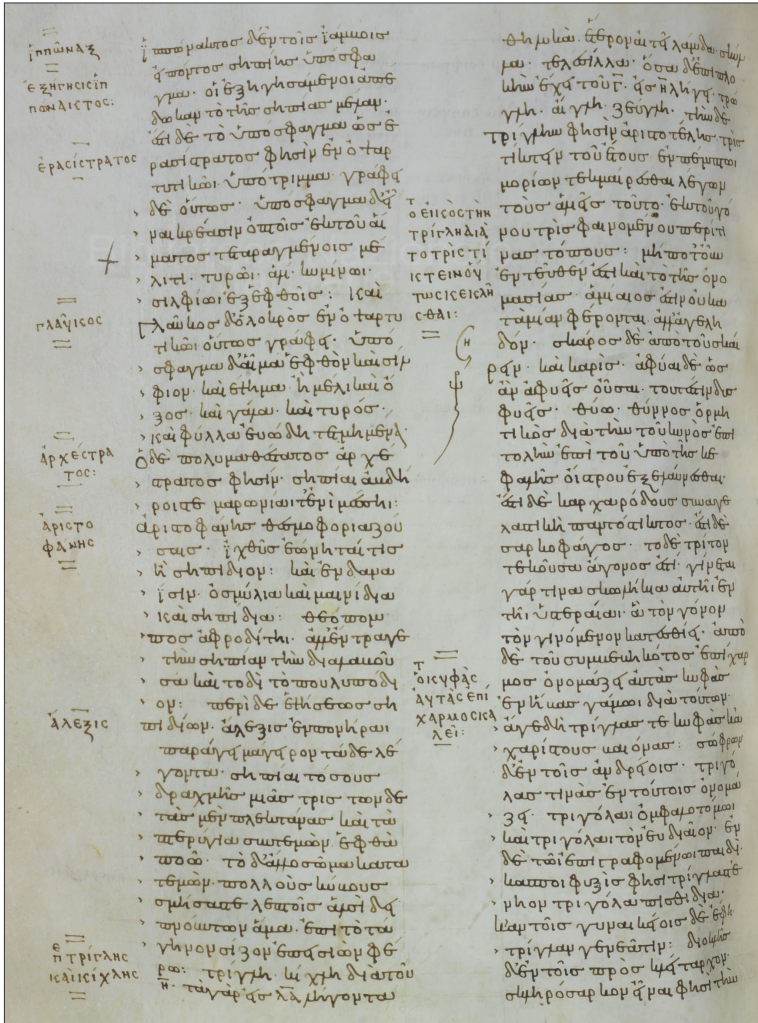
Figure 5.1. *Marcianus Graecus* 447, 124v

provenance, literary activity, and homonymy), work titles with variants, volume numbers, and distinction among different editions of the same work.[10] All these characteristics make the *Deipnosophists* a reference resource for exploring the language used by ancient authors to cite other authors and works.

Figure 5.2. *Digital Athenaeus*: tools

5.2 The Digital Athenaeus Project

The *Digital Athenaeus* is a project that provides scholars with experimental tools for accessing the text of the *Deipnosophists* of Athenaeus of Naucratis and getting information about citations of authors and works that are preserved in it (fig. 5.2): http://www.digitalathenaeus.org.[11] The reason for choosing this work is due to its importance as a rich collection of quotations and text reuses (*fragmenta*) of ancient Greek authors who belong to many different literary genres.[12] The *Deipnosophists* offers the opportunity to experiment with a new way of representing fragmentary texts inside their context of transmission, which is the main concern when collecting evidence about reused authors and works. Textual fragments are a form of hypertext and a digital environment permits to annotate and visualize

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10   Cf. Jacob (2001).

11   The project is currently developed and expanded thanks to a new Deutsche Forschungsgemeinschaft (DFG) grant that I was awarded to work on *Text-based Extraction, Analysis, and Annotation of Ancient Greek References to Authors and Works* (project number 434173983).

12   Berti/Blackwell et al. (2016) 122–123.

them as reuses within their context. This possibility allows to go beyond the limits of printed editions, where extended chunks of texts conserving *fragmenta* of other texts are extracted, decontextualized, and reprinted in other editions.[13]

The *Digital Athenaeus* aims at providing an inventory of authors and works cited by Athenaeus and at implementing a data model for identifying, analyzing, and citing uniquely instances of text reuse in the *Deipnosophists*. This means extracting and annotating a wide variety of elements that pertain to text reuse, such as names of quoted authors, titles and descriptions of quoted works, and in general the language of the text reuse itself. The Greek text of the *Deipnosophists* in the *Digital Athenaeus* is based on the Teubner edition of Georg Kaibel (1887–1890) and the project is producing tools and services for reading the text and generating text reuse related data that are described in the following pages.[14]

5.3 Accessing the text of the Deipnosophists

As of today, the reference edition of the *Deipnosophists* is still represented by Kaibel (1887–1890). The three volumes of this edition are out of copyright and available in public collections like *Internet Archive*. The EpiDoc XML file of the Greek text of this edition is available as part of the `canonical-greekLit` GitHub repository of the *Perseus Digital Library*, where Athenaeus of Naucratis and the *Deipnosophists* are registered as `tlg0008` and `tlg0001`, and the edition of Kaibel as `perseus-grc3.xml`.[15] XML files of the complete edition of Georg Kaibel are available as part of the *Open Greek and Latin* project and include not only the Greek text, but also introductions, indices, and the critical apparatus.[16] The *Perseus*

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13 Cf. pp. 83 ff.
14 Tools and services are available through the homepage of the project with detailed descriptions and instructions. The *Digital Athenaeus* is not producing a new critical edition of the text of the *Deipnosophists*, because this is not the scope of the project and because this task is currently undertaken by Douglas S. Olson: see p. 314 n. 32 and cf. Magnani (2018) 88–89.
15 See https://github.com/PerseusDL/canonical-greekLit/blob/master/data/tlg0008/tlg0001/tlg0008.tlg001.perseus-grc3.xml. The string `perseus-grc3` is not a stable identifier. It is therefore recommended to check the *Perseus Catalog* and possible updates of the GitHub repository. On this problem in relation to the DFHG project, see p. 255. On TLG identifiers, see p. 19 n. 55. On the use of these identifiers in the *Perseus Catalog*, see Babeu (2019).
16 See http://opengreekandlatin.github.io/athenaeus-dev/. These XML files were produced by the data entry company *Digital Divide Data* (DDD), who corrected and encoded the OCR output generated by Bruce Robertson in accordance with the latest EpiDoc standards. They are part of `athenaeus-dev`, whose `-dev(elopment)` suffix indicates that the repository is open to improvement and that the files still need OCR post-correction. This data has been used by the *Digital Athenaeus* project for the creation of the digital versions of the *indices scriptorum* of the *Deipnosophists*: see section 5.5.

Digital Library provides also the Greek and the English translation of the *Deipnosophists* from the edition of Gulick (1951–1957) in two separate EpiDoc XML files (`perseus-grc4.xml` and `perseus-eng2.xml`). The same repository includes also the English translation of Yonge (1854) (`perseus-eng3.xml`).[17] Finally, the complete text of the four volumes of the edition of Meineke (1858–1867) is available as a machine-corrected version in the *Open Greek and Latin* repository.[18]

5.3.1 Greek Text

The *Digital Athenaeus* project is currently based on the Greek text of the Teubner edition of Kaibel (1887–1890).[19] The text is available through an Ajax web page that is automatically generated by a PHP script: http://www.digitalathenaeus.org/tools/KaibelText/index.php. The Ajax technique allows to load, visualize, and navigate the entire text of the *Deipnosophists* in one single HTML page in order to facilitate the usability of the resource (fig. 5.3).[20]

The slide in/out navigation menu, which is accessible through the bar icon on the top left hand side of the header bar, represents the whole tree of the text by books and paragraphs. The "Expand All" and "Collapse All" functions allow to navigate through the text with a comprehensive view of the structure of the edition of the *Deipnosophists* by Kaibel. Every book and every paragraph of the text have a CTS URN expressed according to the *CITE Architecture*, as for example:[21]

– `urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:3` (*Deipn.* 3)
– `urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:3.7` (*Deipn.* 3.7)

The icons on the left of each paragraph are links to external resources: ☰ list icon (automatic alignment of the Greek text of the *Deipnosophists* with entries of the indices by August Meineke, Georg Kaibel, and S. Douglas Olson) and 🏷 tag icon (POS tagging of the text through the *OpenNLP POSTagger for Ancient Greek*).[22]

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17   https://github.com/PerseusDL/canonical-greekLit/tree/master/data/tlg0008/tlg001
18   See http://opengreekandlatin.github.io/athenaeus-dev/. This data has been used by the *Digital Athenaeus* project for the creation of the digital versions of the *indices scriptorum* of the *Deipnosophists*: see section 5.5
19   The text has been extracted from the *Perseus* EpiDoc XML file of the edition of Kaibel. At the time of the creation of the *Digital Athenaeus* resource, the *Perseus* XML file was labelled as `perseus-grc2.xml`, which is the string still used in the CTS URNs of the *Digital Athenaeus* project (see below). In the GitHub repository of the *Perseus Digital Library*, the same XML file is currently labelled as `perseus-grc3.xml`: see n. 15.
20   On the Ajax technique and its use in the DFHG project, see section 4.3.1.2.
21   Thanks to the prefix `http://www.digitalathenaeus.org/tools/KaibelText/index.php#`, these URNs are linkable in order to jump to the relevant book and paragraph of the text of Athenaeus.
22   On these resources, see section 5.5 and p. 165.
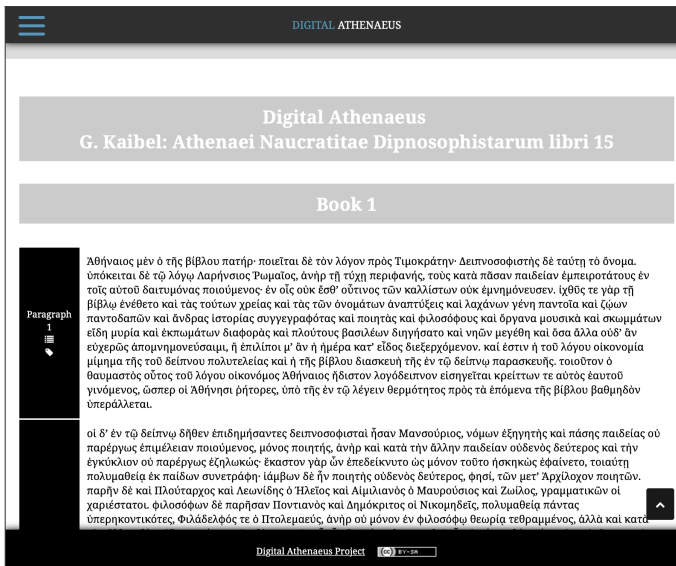
Figure 5.3. *Digital Athenaeus*: Greek text of Georg Kaibel

5.3.2 Search

In the *Digital Athenaeus* project the text of the *Deipnosophists* is searchable in two different ways: 1) by holding down the SHIFT-key when highlighting words of the Greek text of the *Deipnosophists* with the mouse; 2) by searching words directly in the *Search* tool.[23] When available, results display also *Morpheus*' inflected forms and lemmata, *Suda*'s entries, entries from the *Liddell-Scott Lexicon in the CITE Architecture* and entries from the *Named Entities Digger*.[24] Figure 5.4 shows a screenshot with the example of the search of the form Περγάμου, whose lemma Πέργαμος allows to interrogate external resources and obtain information about the word form, its occurrence in the *Suda*, and its function as a Named Entity in the text of the *Deipnosophists*.

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23   http://www.digitalathenaeus.org/tools/KaibelText/search.php
24   For a description of the first three resources and their integration also in the DFHG project, see section 4.3.4. On the *Named Entities Digger* of the *Digital Athenaeus* project, see section 5.6.1.

Figure 5.4. *Digital Athenaeus*: search tool

5.4 Retrieving citations in the Deipnosophists

The first requirement for accessing the text of the Athenaues and for retrieving his citations is to provide stable identifiers based on the *CITE Architecture.*[25] This is the reason why the *Digital Athenaeus* project has created two resources: 1) the *Casaubon-Kaibel Reference Converter* (section 5.4.1) that converts Casaubon references into Kaibel references and generates CTS URNs; 2) the *CTS URN Retriever* (section 5.4.2) that allows to retrieve and cite paragraphs, passages, and words of the *Deipnosophists*.

5.4.1 Casaubon-Kaibel Reference Converter

In spite of the debate about a possible division of the *Deipnosophists* into thirty books, modern editors have been using two different systems for enumerating and referring to the text of the fifteen books of Athenaeus.[26] After the reference

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25   See sections 3.2 and 4.3.5.
26   Zecchini (1989) 10–24; Arnott (2000) 41–52; Lenfant (2007b).

to the book number (1–15), the two systems differ in the division into paragraphs:

1. The first system dates back to the 16th century edition of Isaac Casaubon.[27] This system includes an arabic numeral that refers to the page of the edition of Casaubon followed by a letter (A–F) corresponding to the subdivision of the page into sections of about ten lines of text (e.g., 683b).[28]

2. The second system was used in the 19th century by Johannes Schweighäuser, Wilhelm Dindorf, August Meineke, and Georg Kaibel in their editions of the *Deipnosophists*.[29] In this system each book is logically divided into paragraphs corresponding to units of sense and the paragraphs are referred to with arabic numerals whose numeration starts again at the beginning of each book (e.g., 12.31).[30]

The system of Casaubon allows to cite short passages of text, but is not precise because the letters A–F printed in the page margins are not perfectly aligned with the Greek text, and it's therefore not possible to identify with precision the beginning and the end of a section.[31]

The imprecision of the numeration of Casaubon is problematic also from a computational point of view and this is one of the reasons why the *Thesaurus Linguae Graecae* adopts only "Kaibel paragraphs" for its online edition of the *Deipnosophists* (Kaibel ed.: `tlg0008.001`). Kaibel paragraphs are truly canonical, independent of any particular manifestation of the text; they apply equally well across editions, and to translations. Causabon citations are by definition tied to page-breaks in a particular edition and are therefore not logical, and do not serve well as canonical citations for scholarship in a digital environment (even though

---

27 Casaubon (1597). For a description of the work of Casaubon on Athenaeus, see Arnott (2000). 51–52.

28 Given that the pagination is continuous for the entire edition, this system doesn't require the reference to the book number. Well known examples of similar reference systems are the so called *Bekker pagination* for the works of Aristoteles and the *Stephanus pagination* for the works of Plato.

29 Schweighäuser (1801); Dindorf (1827); Meineke (1858–1867); Kaibel (1887–1890).

30 These editions preserve the numeration of Casaubon on the margin of each page in order to facilitate the correspondence with their texts, but they use only the numeration of Casaubon in the indices.

31 This is evident in every edition published after Casaubon, where Causaubon's references are still adopted but are often different. See, for example, Olson (2006–2012), vol. I, xvii: "Casaubon's pages are generally divided into six sections (a–f), which consist for the most part of ten, or sometimes 11 lines of text; the f-sections may be longer or shorter than the others, and are occasionally omitted, e.g. in the first page of a Book. Because Casaubon's indications of section-divisions are not neatly aligned with his Greek text, I have at times been forced to guess as to where they should be placed. In addition, his sections fail to take account not just of punctuation but even of word-division, and I have chosen to mark them after the words in which they fall, so as to keep my text as readable as possible." On alterations of Casaubon's numbering in some books of the *Deipnosophists*, see Olson (2006–2012), vol. III, vi; vol. IV, vii; vol. V, vii.

they are traditional).[32] Kaibel citations by book and paragraphs are well suited to a digital environment, and in particular to the *CITE Architecture*.[33] This is the reason why they represent the "citation object" of the *Digital Athenaeus* project, which is based on references expressed with CTS urns.

The goal of the *Digital Athenaeus* project is to annotate quotations and text reuses preserved in the *Deipnosophists* to accomplish two main results: 1) provide an inventory of authors and works cited by Athenaeus and 2) implement a data model for identifying, analyzing, and citing uniquely instances of text reuse. The project has therefore produced tools and applied methods for generating semi-automatic annotations and references of text reuses.

The first result was the creation of digital versions of *indices scriptorum* published in printed editions of Athenaeus to map their entries on to the text of the *Deipnosophists*.[34] These *indices* are based on the numeration of Casaubon. It was therefore necessary to convert the numeration of Casaubon into the numeration of Kaibel, in order to generate CTS URNs of the citations of these *indices*.

This is the motivation that brought to the creation of the *Casaubon-Kaibel Reference Converter*, which is a tool that was still missing in the community of Classicists.[35] This task was performed automatically thanks to the *Perseus* EpiDoc XML file of the edition of the *Deipnsophists* by Charles Gulick (`tlg0008.tlg001.perseus-grc4`), which contains the numeration of both Casaubon and Kaibel.[36] In this file Casaubon *sections* are marked up with the element `<milestone>`, while Kaibel *books* and *paragraphs* are marked up with the element `<div>`. Below is an example of the beginning of the *Deipnosophists* in the *Perseus* XML file (Casaubon 1a–f = Kaibel 1.1–2):[37]

```
1  <text n="urn:cts:greekLit:tlg0008.tlg001.perseus-grc4" xml:lang="grc">
2      <body>
3          <pb xml:id="v.1.p.2"/>
4              <div type="edition" n="urn:cts:greekLit:tlg0008.tlg001.
        perseus-grc4" xml:lang="grc">
```

---

32 Berti/Blackwell et al. (2016) 124–125. From now onwards I refer to the numeration of the *Deipnosophists* by books and paragraphs as *Kaibel system*, because the edition of Kaibel is still the reference edition for the work of Athenaeus. S. Douglas Olson is editing a new edition of the *Deipnosophists* for the *Bibliotheca Teubneriana*: see Olson (2019) and Olson (2020).

33 See section 3.2.

34 This work is described in section 5.5.

35 See Lenfant (2007b) 384–385 on the difficulties of getting concordances between Casaubon and Kaibel references.

36 The printed edition of Gulick (1951–1957) contains only the numeration of Casaubon and the numeration of Kaibel was added in the *Perseus* XML file.

37 https://github.com/PerseusDL/canonical-greekLit/blob/master/data/tlg0008/tlg001/tlg0008.tlg001.perseus-grc4.xml

```
5              <div type="textpart" subtype="book" n="1">
6                <div type="textpart" subtype="chapter" n="1">
7                  <p><milestone unit="casaubonpage" xml:id="
     casaubonpage-1a" n="1a"/>Ἀθήναιος μὲν ὁ τῆς βίβλου πατήρ:
     ποιεῖται δὲ τὸν λόγον πρὸς Τιμοκράτην· Δειπνοσοφιστὴς δὲ ταύτῃ τὸ
     ὄνομα. ὑπόκειται δὲ τῷ λόγῳ Λαρήνσιος Ῥωμαῖος, ἀνὴρ τῇ τύχῃ
     περιφανής, τοὺς κατὰ πᾶσαν παιδείαν ἐμπειροτάτους ἐν τοῖς αὐτοῦ
     δαιτυμόνας ποιούμενος· ἐν οἷς οὐκ ἔσθ' οὗτινος τῶν καλλίστων οὐκ
     ἐμνημόνευσεν. ἰχθῦς τε γὰρ τῇ βίβλῳ ἐνέθετο καὶ τὰς τούτων χρείας
     καὶ τὰς τῶν ὀνομάτων ἀναπτύξεις, καὶ λαχάνων γένη παντοῖα.<
     milestone unit="casaubonpage" xml:id="casaubonpage-1b" n="1b"/>
     καὶ ζῴων παντοδαπῶν, καὶ ἄνδρας ἱστορίας συγγεγραφότας καὶ
     ποιητὰς καὶ φιλοσόφους, καὶ ὄργανα μουσικὰ καὶ σκωμμάτων εἴδη
     μυρία· καὶ ἐκπωμάτων διαφορὰς καὶ πλούτους βασιλέων διηγήσατο,
     καὶ νηῶν μεγέθη, καὶ ὅσα ἄλλα οὐδ' ἂν εὐχερῶς ἀπομνημονεύσαιμι, ἢ
     ἐπιλίποι ἄν με ἡ ἡμέρα κατ' εἶδος διεξερχόμενον. καί ἐστιν ἡ τοῦ
     λόγου οἰκονομία μίμημα τῆς τοῦ δείπνου πολυτελείας, καὶ ἡ τῆς
     βίβλου διασκευὴ τῆς ἐν τῷ δείπνῳ<pb xml:id="v.1.p.4"/>παρασκευῆς.
     τοιοῦτον ὁ θαυμαστὸς οὗτος τοῦ λόγου οἰκονόμος Ἀθήναιος ἥδιστον
     λογόδειπνον εἰσηγεῖται κρείττων τε αὐτὸς ἑαυτοῦ γινόμενος, ὥσπερ
     οἱ Ἀθήνησι ῥήτορες, ὑπὸ τῆς ἐν τῷ λέγειν<milestone unit="
     casaubonpage" xml:id="casaubonpage-1c" n="1c"/>θερμότητος πρὸς τὰ
     ἑπόμενα τῆς βίβλου βαθμηδὸν ὑπεράλλεται.
8                  </p>
9                </div>
10               <div type="textpart" subtype="chapter" n="2">
11                 <p>οἱ δ' ἐν τῷ δείπνῳ δῆθεν ἐπιδημήσαντες
     δειπνοσοφισταὶ ἦσαν Μανσούριος, νόμων ἐξηγητὴς καὶ πάσης παιδείας
     οὐ παρέργως ἐπιμέλειαν ποιούμενος, μόνος ποιητής, ἀνὴρ καὶ κατὰ
     τὴν ἄλλην παιδείαν οὐδενὸς δεύτερος καὶ τὴν ἐγκύκλιον οὐ παρέργως
     ἐζηλωκώς· ἕκαστον γὰρ ὧν ἐπεδείκνυτο ὡς μόνον τοῦτο ἠσκηκὼς
     ἐφαίνετο, τοιαύτῃ πολυμαθείᾳ ἐκ παίδων συνετράφη· ἰάμβων δὲ ἦν
     ποιητὴς οὐδενὸς δεύτερος φησί, τῶν μετ' Ἀρχίλοχον ποιητῶν. παρῆν
     δὲ καὶ Πλούταρχος καὶ<milestone unit="casaubonpage" xml:id="
     casaubonpage-1d" n="1d"/>Λεωνίδης ὁ Ἠλεῖος καὶ Αἰμιλιανὸς ὁ
     Μαυρούσιος καὶ Ζωΐλος, γραμματικῶν οἱ χαριέστατοι. φιλοσόφων δὲ
     παρῆσαν Ποντιανὸς καὶ Δημόκριτος οἱ Νικομηδεῖς, πολυμαθείᾳ πάντας
     ὑπερηκοντικότες, Φιλάδελφός τε ὁ Πτολεμαεύς, ἀνὴρ οὐ μόνον ἐν
     φιλοσόφῳ θεωρίᾳ τεθραμμένος, ἀλλὰ καὶ κατὰ τὸν ἄλλον βίον
     ἐξητασμένος. τῶν δὲ κυνικῶν εἰς ἦν ὃν Κύνουλκον καλεῖ· ᾧ οὐ μόνον
     δύο κύνες ἀργοὶ εἵποντο, ὡς τῷ Τηλεμάχῳ ἐκκλησιάζοντι, ἀλλὰ τῶν
     Ἀκταίωνος πολὺ πλείονες. ῥητόρων τε ἦν ἄγυρις τῶν κυνικῶν κατ'
     οὐδὲν ἀπολειπομένη· ὧν κατέτρεχε μετὰ καὶ τῶν ἄλλων ὅσοι τι
     ἐφθέγγοντο Οὐλπιανὸς ὁ Τύριος, ὃς διὰ τὰς συνεχεῖς ζητήσεις,<pb
     xml:id="v.1.p.6"/>ἃς ἀνὰ πᾶσαν ὥραν ποιεῖται ἐν ταῖς ἀγυιαῖς,<
     milestone unit="casaubonpage" xml:id="casaubonpage-1e" n="1e"/>
     περιπάτοις, βιβλιοπωλείοις, βαλανείοις ἔσχεν ὄνομα τοῦ κυρίου
     διασημότερον Κειτούκειτος. οὗτος ὁ ἀνὴρ νόμον εἶχεν ἴδιον μηδενὸς
     ἀποτρώγειν πρὶν εἰπεῖν κεῖται ἢ οὐ κεῖται; οἷον εἰ κεῖται ὥρα ἐπὶ
```

```
        τοῦ τῆς ἡμέρας μορίου, εἰ ὁ μέθυσος ἐπὶ ἀνδρός, εἰ ἡ μήτρα κεῖται
        ἐπὶ τοῦ ἐδωδίμου βρώματος, εἰ σύαγρος κεῖται τὸ σύνθετον ἐπὶ τοῦ
        συός. ἰατρῶν δὲ παρῆσαν Δάφνος Ἐφέσιος, ἱερὸς τὴν τέχνην καὶ κατὰ
        τὰ ἤθη, τῶν Ἀκαδημαϊκῶν λόγων οὐ παρέργως ἁπτόμενος, Γαληνός τε ὁ
        Περγαμηνός, ὃς τοσαῦτ᾽ ἐκδέδωκε συγγράμματα φιλόσοφά τε καὶ
        ἰατρικὰ ὡς πάντας ὑπερβαλεῖν<milestone unit="casaubonpage" xml:id=
        "casaubonpage-1f" n="1f"/>τοὺς πρὸ αὐτοῦ, καὶ κατὰ τὴν ἑρμηνείαν
        οὐδενὸς ὢν τῶν ἀρχαίων ἀδυνατώτερος, Ῥουφῖνός τε ὁ Νικαεύς.
        μουσικὸς δὲ παρῆν Ἀλκείδης ὁ Ἀλεξανδρεύς. καί ἦν ὁ κατάλογος
        οὗτος στρατιωτικός, φησί, μᾶλλον ἢ συμποτικός.
12              </p>
13                      </div>
14                  </div>
15              </div>
16          </pb>
17      </body>
18 </text>
```

The elements `<milestone>` and `<div>` have been extracted from the entire XML file for generating the concordance (fig. 5.5).

```
1   <div type="book" n="1">
2   <div type="chapter" n="1">
3   <milestone unit="casaubonpage" xml:id="casaubonpage-1a" n="1a"/>
4   <milestone unit="casaubonpage" xml:id="casaubonpage-1b" n="1b"/>
5   <milestone unit="casaubonpage" xml:id="casaubonpage-1c" n="1c"/>
6   <div type="chapter" n="2">
7   <milestone unit="casaubonpage" xml:id="casaubonpage-1c" n="1c"/>
8   <milestone unit="casaubonpage" xml:id="casaubonpage-1d" n="1d"/>
9   <milestone unit="casaubonpage" xml:id="casaubonpage-1e" n="1e"/>
10  <milestone unit="casaubonpage" xml:id="casaubonpage-1f" n="1f"/>
11  <div type="chapter" n="3">
12  <milestone unit="casaubonpage" xml:id="casaubonpage-1f" n="1f"/>
13  <milestone unit="casaubonpage" xml:id="casaubonpage-2a" n="2a"/>
14  <milestone unit="casaubonpage" xml:id="casaubonpage-2b" n="2b"/>
15  <div type="chapter" n="4">
16  <milestone unit="casaubonpage" xml:id="casaubonpage-2b" n="2b"/>
17  <milestone unit="casaubonpage" xml:id="casaubonpage-2c" n="2c"/>
18  <milestone unit="casaubonpage" xml:id="casaubonpage-2d" n="2d"/>
19  <milestone unit="casaubonpage" xml:id="casaubonpage-3a" n="3a"/>
20  <milestone unit="casaubonpage" xml:id="casaubonpage-3b" n="3b"/>
21  <milestone unit="casaubonpage" xml:id="casaubonpage-3c" n="3c"/>
22  <milestone unit="casaubonpage" xml:id="casaubonpage-3d" n="3d"/>
23  <div type="chapter" n="5">
24  <milestone unit="casaubonpage" xml:id="casaubonpage-3d" n="3d"/>
25  <milestone unit="casaubonpage" xml:id="casaubonpage-3e" n="3e"/>
26  <milestone unit="casaubonpage" xml:id="casaubonpage-3f" n="3f"/>
27  <milestone unit="casaubonpage" xml:id="casaubonpage-4a" n="4a"/>
28  <div type="chapter" n="6">
29  <milestone unit="casaubonpage" xml:id="casaubonpage-4a" n="4a"/>
30  <milestone unit="casaubonpage" xml:id="casaubonpage-4b" n="4b"/>
31  <milestone unit="casaubonpage" xml:id="casaubonpage-4c" n="4c"/>
32  <milestone unit="casaubonpage" xml:id="casaubonpage-4d" n="4d"/>
33  <div type="chapter" n="7">
34  <milestone unit="casaubonpage" xml:id="casaubonpage-4d" n="4d"/>
35  <milestone unit="casaubonpage" xml:id="casaubonpage-4e" n="4e"/>
36  <milestone unit="casaubonpage" xml:id="casaubonpage-4f" n="4f"/>
37  <milestone unit="casaubonpage" xml:id="casaubonpage-5a" n="5a"/>
```

Figure 5.5. TEI XML elements `<div>` and `<milestone>`: Ath., *Deipn.* 1a–5a

The resulting concordance has been manually checked on the basis of the edition of Kaibel and a database has been created to produce the online *Casaubon-Kaibel Reference Converter*.[38] In addition to the converter, a web-based Application Programming Interface (API) has been produced to integrate data into external services (see below).[39] The tool offers not only the concordance between the two reference systems, but also links to the corresponding pages of the PDF files of the printed editions of Casaubon (1597) and Kaibel (1887–1890), allowing users to automatically read the requested reference in the original edition.[40]
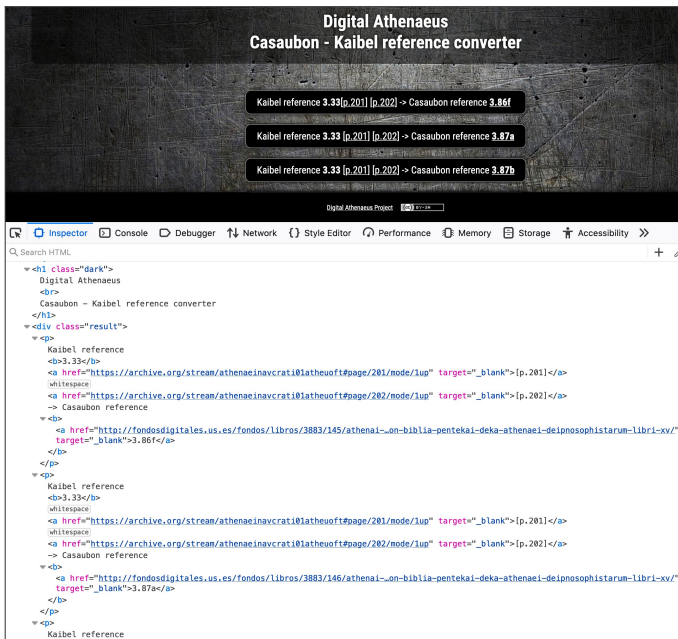
Figure 5.6. *Casaubon-Kaibel Reference Converter*: page links

When the converter was released in 2015, the PDF of the edition of Casaubon was available through the website of the Biblioteca de la Universidad de Sevilla, whose links embedded the actual page numbers of the edition of Casaubon allowing an automatic match with the converter.[41] Figure 5.6 shows a screenshot of the code inspection window of the *Casaubon-Kaibel Reference Converter* page with the ex-

---

38 http://www.digitalathenaeus.org/tools/Casaubon-Kaibel_converter/
39 http://digitalathenaeus.org/tools/Casaubon-Kaibel_converter/api.php
40 Pages of the edition of Kaibel were manually inserted, because the EpiDoc XML file of *Perseus* contains the edition of Charles Gulick with its page numbers, that are different from those of Kaibel (see the element <pb> in the XML code showed above).
41 See https://bib.us.es. Each link pointed to a single page with a high quality image and metadata of the relevant page.

ample of the correspondence between Kaibel 3.33 (pages 201–202) and Casaubon 86f–87c.[42] The window shows the links to the editions of Casaubon (1597) and Kaibel (1887–1890) available through the Biblioteca de la Universidad de Sevilla and *Internet Archive*:

– http://fondosdigitales.us.es/fondos/libros/3883/145/athenai-ou-deipnoso
phiston-biblia-pentekai-deka-athenaei-deipnosophistarum-libri-xv/

– https://archive.org/stream/athenaeinavcrati01atheuoft#page/201/mode/1
up

As of 2020, the links to the website of Sevilla don't point anymore to the Spanish library, but to *Internet Archive*, where the edition of Casaubon is available as part of the Fondo Antiguo de la Universidad de Sevilla.[43] In this case, unfortunately, the page numbers of the links don't correspond to the edition of Casaubon and, in order to generate the new corresponding links that are now available in the converter, pages had to be manually searched or inferred from their sequence.[44]

An alternative solution is to link the *Casaubon-Kaibel Reference Converter* to the edition of the *Deipnosophists* published by Casaubon in 1657, which is available through *Google Books* (Casaubon (1657) – Google ID: = `ZvGCkzC6SkEC&hl` = https://books.google.com/books?id=ZvGCkzC6SkEC&hl). In this case the actual page numbers of the edition are embedded in the URL of each page of the PDF. For example, https://books.google.com/books?id=ZvGCkzC6SkEC&hl=de&pg=PA179 includes the reference to Casaubon page 179.[45]

As anticipated before, the *Casaubon-Kaibel Reference Converter* provides a web-based API with a JSON output for integrating data into external services. The API can be queried with Casaubon or Kaibel references:[46]

```
api.php?ref_system=<casaubon/kaibel>&reference=<Casaubon/Kaibel Reference>
```

---

42 http://www.digitalathenaeus.org/tools/Casaubon-Kaibel_converter/concordances.php?c
as=&kai=3.33&html=yes

43 https://archive.org/details/bibliotecauniversitariadesevilla

44 See https://archive.org/details/ARes28201. High quality color images of the edition of Casaubon (1597) are available through the platform for digitized rare books from Swiss libraries (https://doi.org/10.3931/e-rara-6872), but also in this case links don't correspond to the page numbers of the printed edition. At 11.466d of the edition of Casaubon (1597), there is a lacuna in the text, because a few folios of codex A were lost and the text begins again after 466e. The lacuna was filled in by Johannes Schweighäuser with the insertion of the *Supplementum Libri Undecimi* that Casaubon obtained from the epitome contained in the codices C ed E and inserted at the end of book 15 (*Animadversiones in Athenaei Deipnosophistas*, VI, 1804 466). This explains why, after 466d, there is a section that runs from 781b to 784d. After this section, starts again the numeration with 466d. In the *Casaubon-Kaibel Reference Converter* this section is present, but links to the pages of the edition of Casaubon are missing, because these pages are missing in the copy of the University of Sevilla.

45 On *Google Books* parameters, see pp. 142 ff.

46 http://digitalathenaeus.org/tools/Casaubon-Kaibel_converter/api.php

I present here two examples:

1) Ath., *Deipn.* 373a (Casaubon):

```
[
    {
        "casaubon": "9.373a",
        "casaubon link": "http://fondosdigitales.us.es/fondos/libros
    /3883/432/athenai-ou-deipnosophiston-biblia-pentekai-deka-athenaei-
    deipnosophistarum-libri-xv/",
        "kaibel": "9.15",
        "kaibel link": "https://archive.org/stream/
    athenaeinavcrati02atheuoft#page/314/mode/1up"
    },
    {
        "casaubon": "9.373a",
        "casaubon link": "http://fondosdigitales.us.es/fondos/libros
    /3883/432/athenai-ou-deipnosophiston-biblia-pentekai-deka-athenaei-
    deipnosophistarum-libri-xv/",
        "kaibel": "9.15",
        "kaibel link": "https://archive.org/stream/
    athenaeinavcrati02atheuoft#page/315/mode/1up"
    },
    {
        "casaubon": "9.373a",
        "casaubon link": "http://fondosdigitales.us.es/fondos/libros
    /3883/432/athenai-ou-deipnosophiston-biblia-pentekai-deka-athenaei-
    deipnosophistarum-libri-xv/",
        "kaibel": "9.15",
        "kaibel link": "https://archive.org/stream/
    athenaeinavcrati02atheuoft#page/316/mode/1up"
    }
]
```

2) Ath., *Deipn.* 1.10 (Kaibel):

```
[
    {
        "kaibel": "1.10",
        "kaibel link": "https://archive.org/stream/
    athenaeinavcrati01atheuoft#page/12/mode/1up",
        "casaubon": "1.6b",
        "casaubon link": "http://fondosdigitales.us.es/fondos/libros
    /3883/65/athenai-ou-deipnosophiston-biblia-pentekai-deka-athenaei-
    deipnosophistarum-libri-xv/"
    },
    {
        "kaibel": "1.10",
        "kaibel link": "https://archive.org/stream/
```

```
athenaeinavcrati01atheuoft#page/13/mode/1up",
    "casaubon": "1.6b",
    "casaubon link": "http://fondosdigitales.us.es/fondos/libros
/3883/65/athenai-ou-deipnosophiston-biblia-pentekai-deka-athenaei-
deipnosophistarum-libri-xv/"
},
{
    "kaibel": "1.10",
    "kaibel link": "https://archive.org/stream/
athenaeinavcrati01atheuoft#page/12/mode/1up",
    "casaubon": "1.6c",
    "casaubon link": "http://fondosdigitales.us.es/fondos/libros
/3883/65/athenai-ou-deipnosophiston-biblia-pentekai-deka-athenaei-
deipnosophistarum-libri-xv/"
},
{
    "kaibel": "1.10",
    "kaibel link": "https://archive.org/stream/
athenaeinavcrati01atheuoft#page/13/mode/1up",
    "casaubon": "1.6c",
    "casaubon link": "http://fondosdigitales.us.es/fondos/libros
/3883/65/athenai-ou-deipnosophiston-biblia-pentekai-deka-athenaei-
deipnosophistarum-libri-xv/"
},
{
    "kaibel": "1.10",
    "kaibel link": "https://archive.org/stream/
athenaeinavcrati01atheuoft#page/12/mode/1up",
    "casaubon": "1.6d",
    "casaubon link": "http://fondosdigitales.us.es/fondos/libros
/3883/65/athenai-ou-deipnosophiston-biblia-pentekai-deka-athenaei-
deipnosophistarum-libri-xv/"
},
{
    "kaibel": "1.10",
    "kaibel link": "https://archive.org/stream/
athenaeinavcrati01atheuoft#page/13/mode/1up",
    "casaubon": "1.6d",
    "casaubon link": "http://fondosdigitales.us.es/fondos/libros
/3883/65/athenai-ou-deipnosophiston-biblia-pentekai-deka-athenaei-
deipnosophistarum-libri-xv/"
}
]
```

5.4.2 CTS URN Retriever

The *CTS URN Retriever* is a tool for retrieving and citing paragraphs, passages, and words in the text of the *Deipnosophists* by typing the corresponding CTS URN.[47] The syntax of the URNs follows the specification of the *CITE Architecture*. For example:

– Ath. *Deipn.* 3.7: `urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:3.7`
– The second occurrence of the word βίβλου in Ath. *Deipn.* 1.1: `urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:1.1@βίβλου[2]`
– The quotation of the words of Antiphanes (ἀεὶ δὲ πρὸς Μούσαισι καὶ λόγοις πάρει, ὅπου τι σοφίας ἔργον ἐξετάζεται) in Ath. *Deipn.* 1.4: `urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:1.4@ἀεὶ[1]-ἐξετάζεται[1]`

The tool allows also users to type only book and paragraph of the *Deipnosophists* and get the corresponding CTS URN, as for example `13.7` (= Ath. *Deipn.* 13.7).[48] Using CTS URNs, it is possible to export citations of the *Deipnosophists* down to the word level.[49]
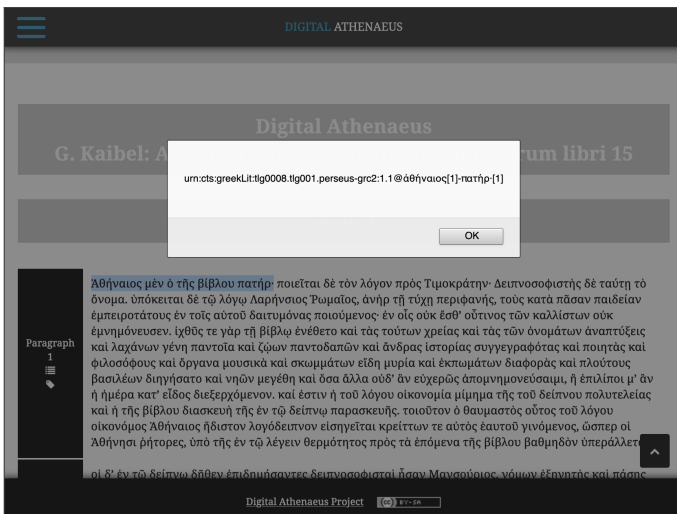
Figure 5.7. *Digital Athenaeus: CTS URN Retriever*

By selecting a portion of text holding down the ALT-key, users get a pop-up window with the CTS URN that identifies the selected chunk of text. For example,

---

47   http://www.digitalathenaeus.org/tools/KaibelText/cts_urn_retriever.php
48   http://www.digitalathenaeus.org/tools/KaibelText/cts_urn_retriever.php?URN=13.7
49   See section 4.3.5 for the use of this function also in the DFHG project.

by selecting Ἀθήναιος μὲν ὁ τῆς βίβλου πατήρ in Ath. *Deipn.* 1.1, it is possible to obtain the corresponding CTS URN (fig. 5.7).

5.5 Looking for Athenaeus' Quotations

One of the goals of the *Digital Athenaeus* is to experiment with semi-automatic annotations of data related to text reuse. This is the reason why the project has produced digital versions of indices of authors and works published in the printed editions of the *Deipnosophists* by August Meineke, Georg Kaibel, and S. Douglas Olson.[50] SQL databases of these indices have been created starting from OCR outputs of the printed editions and have been enriched with automatically converted Kaibel references and with links to external resources for reading the whole context of each reference.[51] Dynamic graphs generate graphic visualizations of the indices and web APIs with a JSON output allows to integrate data into external services. These indices offer lists of author names and work titles cited by Athenaeus and they can be considered as already disambiguated lists of named entities (author names and work titles) to be mapped on to the text of the *Deipnosophists* to obtain a first set of annotations pertaining to text reuse.[52] The following sections describe characteristics and functions of each of these indices.

5.5.1 Meineke – Index Scriptorum

This index is part of the third volume of the Teubner edition of the *Deipnosophists* published by August Meineke in 1859 (*Index Scriptorum*).[53] The index includes a list of authors and works cited by Athenaeus and the digital version of it has been created starting from the OCR output of the printed volume.[54] The OCR output has been parsed using bash scripts and manually corrected in order to create

---

50   Meineke (1858–1867); Kaibel (1887–1890); Olson (2006–2012).
51   For experiments with testing OCR of ancient Greek using different editions of the *Deipnosophists*, see Boschetti (2018) 11–29 with further bibliography.
52   This is not the case of the index by Olson (section 5.5.4), because it includes not only authors but also other personal names (*index of authors, texts, and persons*). The *Digital Athenaeus* offers also the *Dialogi Personae* by Georg Kaibel (section 5.5.3), because this is a list of the names of the sophists who participate in the dialogues described by Athenaeus and who actually quote other authors and works. On the history of indices and on the practice of index-making, see Wheatley (1878).
53   Meineke (1858–1867), vol. III 452–499. Meineke published also an *Index Rerum* (283–452).
54   See http://www.digitalathenaeus.org/tools/MeinekeIndexScriptorum/. The digitization of the edition of Meineke has been performed as part of the *Open Greek and Latin* project: see section 5.3.

an SQL database organized in fields containing data collected and arranged by Meineke for each author and work. The following lines show the XML output of the OCR of the first page of the printed edition (p. 452):[55]

```
1  <div type="commentary" subtype="index">
2      <head>INDEX SCRIPTORUM</head>
3          <p>A</p>
4          <p>Acesias. Ὀψαρτυτικά XII 516 c.</p>
5          <p>Acestius. Ὀψαρτυτικά XII 516 c.</p>
6          <p>Achaeus Eretriensis I 30f. II 63 b. VI 270 e. X 414 e. XI
       480 f. ὁ τραγικός XI 466 e. Ἄθλοι X 417 f. XV 689 b. Αἴθων
       σατυρικός VI 270 c. IX 368 a. 376 a. X 427 c. XV 690 b. Ἀλκμαίων
       ὁ σατυρικός IV 173 d. e. XI 480 f. Ἥφαιστος σατυρικός XIV 637 c.
       Ἶρις σατυρική X 451 c. Κύκνος VI 270 e. Λίνος XV 668 a. Μοῖραι VII
        277 b. Ὀμφάλη VI 267. d. XI 466 e.f. 498 d.</p>
7          <p>Adaeus Mytilenaeus XIII 606 a. περὶ διαθέσεως XI 471 f.
       περὶ ἀγαλματοποιῶν XIII 606 a.</p>
8          <p>Adrantus. περὶ τῶν παρὰ Θεοφράστῳ ἐν τοῖς περὶ ἠθῶν καθ'
       ἱστορίαν καὶ λέξιν ζητουμένων XV 673 e. περὶ τῶν ἐν τοῖς Ἠθικοῖς
       Νικομαχείοις Ἀριστοτέλους XV 673 e.f.</p>
9          <p>Aegimius. Πλακουντοποιικὰ συγγράμματα XIV 644 e.</p>
10         <p>Aelius Asclcpiades. Στέφανοι XV 676 f. (679 b.)</p>
11         <p>Aeschines orator. ὁ Κοθωκίδης ῥήτωρ VI 223 d. κατὰ Τιμάρχου
       λόγος VIII I 330 b. XIII 572 c.</p>
12         <p>Aeschincs Socraticus. eius dialogi XIII 611 d. Ἀλκιβιάδης
       XIV 656 f. Ἀξίοχος V 220 c. Ἀσπασία V 220 b. Καλλίας V 220 b.
       Τηλαύγης V 220 a.</p>
13         <p>Aeschrio Samius. Ἴαμβοι VII 296 c. VIII 335 c.</p>
14         <p>Aeschrlides. Γεωργικά XIV 650 d.</p>
15         <p>Aeschylus Alexandrinus. Ἀμφιτρύων et Μεσσηνιακὰ ἔπη XIII 599
       e.</p>
16         <p>Aeschylus Athenieusis tragicus I 11 d. 17 c. 21 f. II 37 f.
       67 f. Il c. 87 p. 130. ed. nostrae. VIII 362 f. IX 375 d. e. XI
       782 e. 491 a. XII 528 c. XIII 573 b. 601 b. Ἀγαμέμνων XV 700 e.
       Ἀθάμας VII 316 b. Ἀμυμώνη XV 690 c. Γλαῦκος πόντιος III 87 a.
       Δαωαῖδες XIU 600a. Ἑπτὰ ἐπὶ Θήβαις l 22 a. (ubi Θήβας.) VII 294 a.
        295 e. Ἠδωνοί XI 479 b. Ἠλιάδες 424 d. XI 469 f. Θεωροί XIV
       Ἰξίων IV 177 a. 182 c. Κάβειροι IX 373 d. X 428 f. Κρῆσσαι II 51 c
       . Λυκοῦργος X 447 c. Μυρμιδόνες XIII 602 e. Νεανίσκοι XI 503 c. d.
       Ὀστολόγοι XV 667 c. Περραιβίδες XI 476 c. 499 a. Πέρσαι III 86 b.
       Προμηθεὺς δεσμώτης IV 165 c. VIII 347 c. Προμηθεὺς <pb n="453"/>
       λυόμενος XV 674 d. Πρωτεὺς τραγικός IX 394 a. Σφίγξ XV 674 d,
       Φιλοκτήτης IX 394 a. Φινεύς X 421 f. Φορκίδες IX 102 b. Φρύγες I
       21 f. II 51 c. epigramma quod sepnlcro suo inscriptum voluit
       Aeschylus XIV 627 c. d. Aeschylus tragoedias suas perhibetur
       ebrius conscribere solitus I 22 a. X 428 f. tragoedias suas aiebat
```

```
 esse reliquias magnarum Homeri cocnarum VIII 347 e. victus
aliquando dixit posteritati se tragoedias suas consecrare ibid.
multis usus est vocabulis Italicis, ufpote in Sicilia aliquamdiu
versatns IX 402 c.</p>
```

The code shows that each index entry is embedded in a TEI XML element <p>. Each entry has been extracted and semi-automatically structured in order to separate data. For example, the entry about Tryphon Alexandrinus (p. 498) has been structured in the following way:[56]

Name	Ethnicon	Characteriz.	Note	Work	SubWork	Reference	Note
Tryphon	Alexandrinus					III.109b	
Tryphon	Alexandrinus					IV.182e	
Tryphon	Alexandrinus					VII.299a	
Tryphon	Alexandrinus					IX.397e	
Tryphon	Alexandrinus					400a	
Tryphon	Alexandrinus					XIV.640e	
Tryphon	Alexandrinus			περὶ Ἀττικῆς προσῳδίας		II.53a	
Tryphon	Alexandrinus			περὶ ζῴων		VII.324f	
Tryphon	Alexandrinus			περὶ ὀνομασιῶν	liber tertius	IV.174e	ubi citatur liber tertius, qui inscribitur περὶ αὐλῶν καὶ ὀργάνων
Tryphon	Alexandrinus			περὶ ὀνομασιῶν	liber secundus	XIV.618c	
Tryphon	Alexandrinus			περὶ ὀνομασιῶν	liber secundus	634d	
Tryphon	Alexandrinus			Τρύφων ἐν τοῖς Ὀνομαστιχοῖς		XI.503d	

This data has been further structured to extract Athenaeus' book numbers and convert Casaubon citations into Kaibel citations using the *Casaubon-Kaibel Reference Converter* (section 5.4.1). Roman numerals have been converted into Arabic numerals and the entire *index* has been proofread to correct OCR errors.

The first interesting complexity is represented by the different lengths of Casaubon sections and Kaibel paragraphs. For example, Kaibel 9.15 corresponds to Casaubon 373a–e.[57] On the other side, Casaubon 502b corresponds to Kaibel

---

56 In this example the entry doesn't have data for the fields `Characterization` and `Note`, that are filled in for other entries (see below).

57 http://www.digitalathenaeus.org/tools/Casaubon-Kaibel_converter/concordances.php?cas=&kai=9.15&html=yes

11.105–107.[58] These differences between the two reference systems generate ambiguities in the conversion of index references. For example, the automatic conversion of the first Casaubon reference to Tryphon Alexandrinus in the *Index Scriptorum* of Meineke (p. 498) results in two Kaibel paragraphs: 109b = 3.73 and 3.74. Only the reading of the text of the *Deipnosophists* permits to disambiguate the reference and see if the citation of Tryphon Alexandrinus corresponds to Kaibel 3.73 or 3.74.

This is the reason why the *Digital Athenaeus* project has inserted an experimental voting system to enable users to vote for ambiguous references. Figure 5.8 shows the example of Tryphon Alexandrinus in the online *Index Digger* of the *Index Scriptorum* of Meineke, where the interface includes a `Vote` button to enable users to vote and disambiguate the reference.[59] This `Vote` functionality is experimental, because further work for disambiguating references is currently done through the automatic alignment of index entries with the Greek text of the *Deipnosophists* and through Named Entity Recognition.[60] Votes are collected in the database of the *Digital Athenaeus* and their percentage is visible in the *Index Digger*.[61]

Digital Athenaeus
A. Meineke: Athenaei Deipnosophistae - Index Scriptorum

Insert one or more entry... OR Submit

Where Name="Tryphon"

#	Name	Ethnicon	Characterization	Note	Work	Sub Work	Athenaeus Book	Casaubon Reference	Kaibel reference	Vote	Note (Reference)	Read Greek Text (Perseus)	Read Greek Text (FrontEnd UniLeipzig)	Annotate with Perseids
6707	Tryphon	Alexandrinus					3	3.109b	3.73 3.74	Vote		3.73 3.74	3.73 - 3.74	3.73 - 3.74
6708	Tryphon	Alexandrinus					4	4.182e	4.80			4.80	4.80	4.80
6709	Tryphon	Alexandrinus					7	7.299a	7.53 7.54	Vote		7.53 7.54	7.53 - 7.54	7.53 - 7.54
6710	Tryphon	Alexandrinus					9	9.397e	9.57			9.57	9.57	9.57
6711	Tryphon	Alexandrinus					9	9.400a	9.62			9.62	9.62	9.62
6712	Tryphon	Alexandrinus					14	14.640e	14.46 14.47	Vote		14.46 14.47	14.46 - 14.47	14.46 - 14.47
6713	Tryphon	Alexandrinus			περὶ Ἀττικῆς προσῳδίας		2	2.53a	2.40			2.40	2.40	2.40
6714	Tryphon	Alexandrinus			περὶ ζῴων		7	7.324f	7.125			7.125	7.125	7.125
6715	Tryphon	Alexandrinus			περὶ ὀνομασῶν	liber tertius	4	4.174e	4.75 4.76	Vote	ubi citatur liber tertius, qui inscribitur περὶ αὐλῶν καὶ ὀργάνων	4.75 4.76	4.75 - 4.76	4.75 - 4.76
6716	Tryphon	Alexandrinus			περὶ ὀνομασῶν	liber secundus	14	14.618c	14.9 14.10	Vote		14.9 14.10	14.9 - 14.10	14.9 - 14.10
6717	Tryphon	Alexandrinus			περὶ ὀνομασῶν	liber secundus	14	14.634d	14.35			14.35	14.35	14.35
6718	Tryphon	Alexandrinus			Τρύφων ἐν τοῖς Ὀνομαστικοῖς		11	11.503d	11.109 11.110	Vote		11.109 11.110	11.109 - 11.110	11.109 - 11.110

Figure 5.8. Meineke, *Index Scriptorum*: Tryphon Alexandrinus

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58 http://www.digitalathenaeus.org/tools/Casaubon-Kaibel_converter/concordances.php?cas=502b&kai=&html=yes

59 The entry of Tryphon Alexandrinus is available at http://www.digitalathenaeus.org/tools/MeinekeIndexScriptorum/digger.php?what[]=Name|Tryphon&onoffswitch=on.

60 See sections 5.5.5, 5.5.6, and 5.6.

61 Experiments on voting ambiguous references were done by students during the CHS Summer Internship in Publications at the Center of Hellenic Studies in Summer 2016 (see p. 245) and by Samantha Strickland from Furman University during her Fulbright fellowship at the University of Leipzig in the Academic Year 2015/2016.

The second interesting complexity is represented by reference ranges. For example, the sixth reference to Mnesimachus in the *Index Scriptorum* of Meineke (p. 484) is Casaubon 402f–403d. This reference has been expanded and split into the corresponding Casaubon sections, which are convertible into the following Kaibel paragraphs: 402f = 9.67, 403a = 9.67, 403b = 9.67, 403c = 9.67, 403d = 9.67, 403d = 9.68. In order to preserve the range, the database of the *Index Scriptorum* includes a field called `Is_Range`, whose records *range start*, *range*, and *range end* keep track of reference ranges. Figure 5.9 shows the example of the range 402f– 403d as represented in the database. The *Index Digger* of the *Index Scriptorum* represents the range by grouping references in a black rectangle, which is visible in the example of Mnesimachus at figure 5.10.[62]

Mnesimachus	comicus	Ἱπποτρόφος	7	7.329d	7.138	0	
Mnesimachus	comicus	Ἱπποτρόφος	9	9.402f	9.67	0	range start
Mnesimachus	comicus	Ἱπποτρόφος	9	9.403a	9.67	0	range
Mnesimachus	comicus	Ἱπποτρόφος	9	9.403b	9.67	0	range
Mnesimachus	comicus	Ἱπποτρόφος	9	9.403c	9.67	0	range
Mnesimachus	comicus	Ἱπποτρόφος	9	9.403d	9.67@9.68	0	range end
Mnesimachus	comicus	Φίλιππος	8	8.338b	8.19@8.20	0	

Figure 5.9. Meineke, *Index Scriptorum*: Casaubon reference range

Digital Athenaeus
A. Meineke: Athenaei Deipnosophistae - Index Scriptorum

Insert one or more entry... OR ⬤ Submit

Where Name="Mnesimachus"

#	Name	Ethnicon	Characterization	Note	Work	Sub Work	Athenaeus Book	Casaubon Reference	Kaibel reference	Vote	Note (Reference)	Read Greek Text (Perseus)	Read Greek Text (FrontEnd UniLeipzig)	Annotate with Perseids
4581	Mnesimachus		comicus		Βούσιρις		10	10.417e	10.11			10.11	10.11	10.11
4582	Mnesimachus		comicus		Δύσκολος		8	8.359c	8.58			8.58	8.58	8.58
4583	Mnesimachus		comicus		Ἱπποτρόφος		7	7.301d	7.61 7.62	Vote		7.61 7.62	7.61 - 7.62	7.61 - 7.62
4584	Mnesimachus		comicus		Ἱπποτρόφος		7	7.322e	7.120			7.120	7.120	7.120
4585	Mnesimachus		comicus		Ἱπποτρόφος		7	7.329d	7.138			7.138	7.138	7.138
4586	Mnesimachus		comicus		Ἱπποτρόφος		9	9.402f	9.67			9.67	9.67	9.67
4587	Mnesimachus		comicus		Ἱπποτρόφος		9	9.403a	9.67			9.67	9.67	9.67
4588	Mnesimachus		comicus		Ἱπποτρόφος		9	9.403b	9.67			9.67	9.67	9.67
4589	Mnesimachus		comicus		Ἱπποτρόφος		9	9.403c	9.67			9.67	9.67	9.67
4590	Mnesimachus		comicus		Ἱπποτρόφος		9	9.403d	9.67 9.68	Vote		9.67 9.68	9.67 - 9.68	9.67 - 9.68
4591	Mnesimachus		comicus		Φίλιππος		8	8.338b	8.19 8.20	Vote		8.19 8.20	8.19 - 8.20	8.19 - 8.20
4592	Mnesimachus		comicus		Φίλιππος		9	9.387b	9.37			9.37	9.37	9.37
4593	Mnesimachus		comicus		Φίλιππος		10	10.416b	10.11 10.12	Vote		10.11 10.12	10.11 - 10.12	10.11 - 10.12
4594	Mnesimachus		comicus		Φίλιππος		10	10.421b	10.17 10.18	Vote		10.17 10.18	10.17 - 10.18	10.17 - 10.18
4595	Mnesimachus		comicus		Φίλιππος		10	10.421c	10.18			10.18	10.18	10.18

Figure 5.10. Meineke, *Index Scriptorum*: Mnesimachus

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62 The entry of Mnesimachus is available at http://www.digitalathenaeus.org/tools/Meineke IndexScriptorum/digger.php?what[]=Name|Mnesimachus&onoffswitch=on. Preserving reference ranges is important, because this is a way for showing the extension of a citation according to the interpretation of a scholar (in this case August Meineke).

Greek and Latin expressions used by Meineke in his *index* have been preserved and entries have been structured to separate data in the following search fields that are accessible through the *Index Digger*:[63]

- `Name`: author name (e.g., Anaxandrides) and other index entries (e.g., Anonymi poetae);
- `Ethnicon`: place of origin of an author (e.g., Cnidius);
- `Characterization`: literary genre or profession of an author (e.g., medicus);
- `Note`: Meineke's notes to name, ethnicon and/or characterization fields (e.g., vixit Sophoclis aetate);
- `Work`: work titles (e.g., Σικελικά);
- `Sub Work`: sub works or book numbers (e.g., γ′);
- `Athenaeus Book`: book numbers of the *Deipnosophists* for each occurrence (e.g., Book 7);
- `Casaubon Reference`: references to passages in the *Deipnosophists* where authors and works are cited (e.g., 2.67e);
- `Kaibel Reference`: conversion of Casaubon references into Kaibel references (e.g., 2.76);
- `Note (Reference)`: Meineke's notes to Casaubon references (e.g., conf. Σύνδειπνοι).

Additional output fields allow users to vote and disambiguate differences between Casaubon and Kaibel references, to read the text of the *Deipnosophists* corresponding to each citation reference, and also to annotate quotations:

- `Vote`: disambiguate and vote the right correspondence between Casaubon sections and Kaibel paragraphs (e.g., 573b = 13.31 and/or 13.32);[64]
- `Read Greek Text (Perseus)`: link to the Greek text of the *Deipnosophists* in the *Perseus Digital Library*;[65]
- `Read Greek Text (FrontEnd UniLeipzig)`: link to the Greek text of the *Deipnosophists* in the *CTS FrontEnd* of the University of Leipzig;[66]
- `Annotate with Perseids`: annotate quotations and text reuses with the *Perseids Fragmentary Texts Editor*.[67]

---

63   http://www.digitalathenaeus.org/tools/MeinekeIndexScriptorum/digger.php
64   On the reason of this functionality, see p. 325.
65   The text of the edition of Kaibel (1887–1890) is published in the *Perseus Digital Library*: http://www.perseus.tufts.edu/hopper/text?doc=urn:cts:greekLit:tlg0008.tlg001.perse us-grc2. *Perseus* visualizes only one paragraph per page and, in the case of ambiguous Kaibel paragraphs, users have two open two windows to read both paragraphs and vote the correct one.
66   See Reckziegel/Jänicke et al. (2016). In this case the tool allows to scroll through the entire text of Athenaeus and therefore read paragraphs in their sequence.
67   On the Perseids editor, see section 3.3. Each passage of the *Index Scriptorum* can be opened in the *Fragmentary Texts Editor*, but the annotation functionality is not anymore fully supported by *Perseids*.

WORK citations in Athenaeus where NAME is like HOMERUS
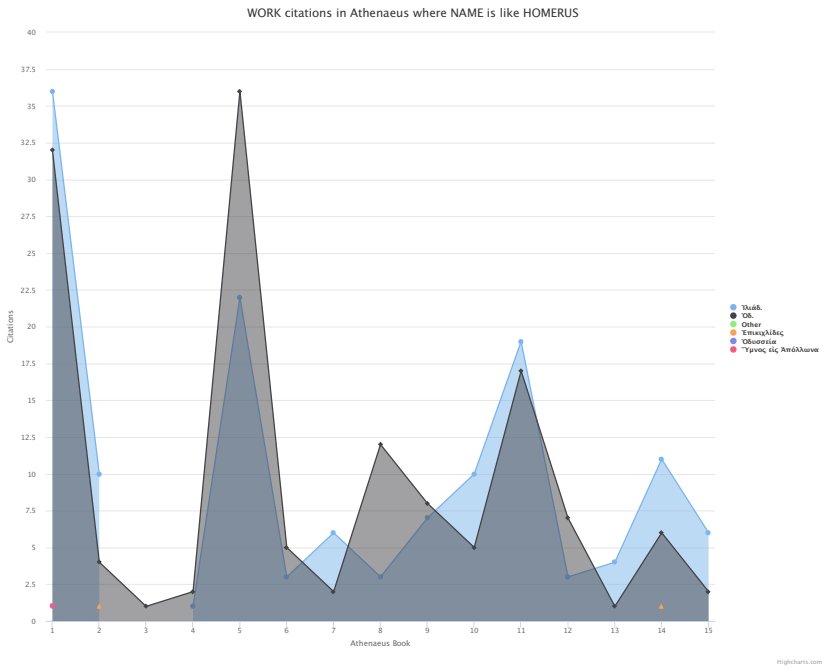
Figure 5.11. *Dynamic Graph* (Meineke): Homerus

Digital Athenaeus
A. Meineke: Athenaei Deipnosophistae - Index Scriptorum

Plot [name ▾] occurences by Athenaeus' Book

and, if you want, filter by [something... ▾] and/or limited to the first _____ N results.

[Submit]
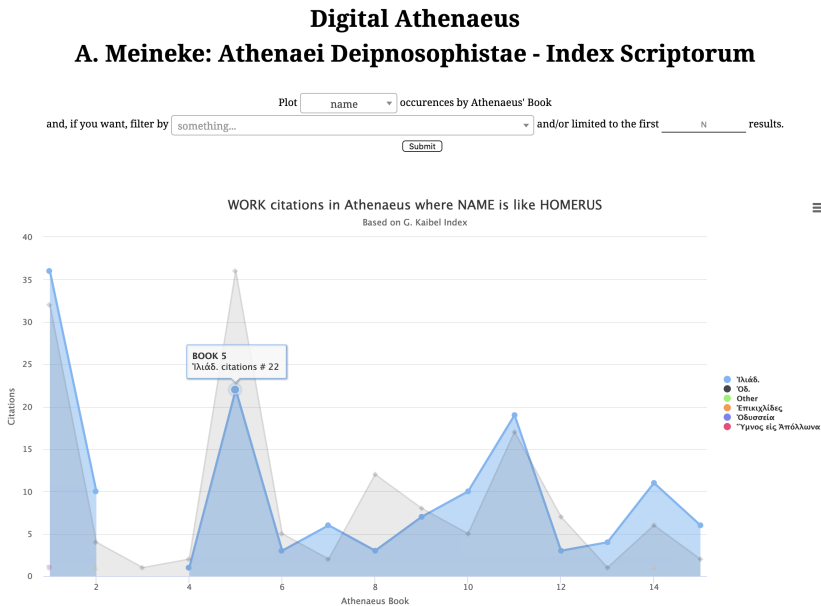
Figure 5.12. *Dynamic Graph* (Meineke): Homerus

The *Index Digger* can be used also to obtain combined search results, as for example: `Name` (Homerus) AND `Work` (Ὀδ.); `Characterization` (orator) AND `Athenaeus Book` (Book 13); `Work` (Ἱππεῖς) OR `Work` (Εἰρήνη).

The digital version of the *Index Scriptorum* offers also a *Dynamic Graph* to produce a graphic visualization of index data.[68] Results in the *Dynamic Graph* can be obtained by filtering data using the following filter fields:

– `Name`: author name (e.g., Anaxandrides) and other index entries (e.g., Anonymi poetae);
– `Ethnicon`: place of origin of an author (e.g., Cnidius);
– `Characterization`: literary genre or profession of an author (e.g., medicus);
– `Work`: work titles (e.g., Γαστρονομία);
– `Sub Work`: sub works or book numbers (e.g., δʹ).

The following are examples of filtered search results with their corresponding links to the *Dynamic Graph*: `Work` + `Name` (Homerus) (fig. 5.11); `Name` + `Characterization` (comicus); `Name` + `Characterization` (comicus) (limited to the first 10 results). Results of the *Dynamic Graph* are visualized through *Highcharts*, can be printed, and can be downloaded as PNG image, JPEG image, PDF document and SVG vector image. It is also possible to hide/show graphs by selecting/des-

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68 http://www.digitalathenaeus.org/tools/MeinekeIndexScriptorum/dynamic_graph.php

electing entries in the list at the right of the chart, and visualize the number of occurrences in each book of the *Deipnosophists* by hovering the mouse over the selected book (fig. 5.12).

The *Digital Athenaeus* provides also a *Web API* with a JSON output of *Index Digger* queries of the *Index Scriptorum* of Meineke:[69]

```
api.php?what=<search string>&where=<search field>&exact=[yes:no]
```

Search fields of the Web API can be one of the following: `name`, `ethnicon`, `characterization`, `note`, `work`, `sub_work`, `book`, `casaubon_reference`, `kaibel_reference`, `note_reference`. For example, if we want to visualize how the `characterization` *historicus* is used by Meineke in his *index*, we get the following result:[70]

```
[
    {
        "Name": "Demophilus",
        "Ethnicon": "",
        "Characterization": "historicus",
        "Note": "",
        "Work":"'Έφορος ἢ Δημόφιλος ὁ υἱὸς αὑτοῦ ἐν τῇ τριακοστῇ τῶν
 ἱστοριῶν",
        "Sub_Work": "",
        "Book": "6",
        "Casaubon_Reference": "6.232d",
        "Kaibel_Reference": "6.21 and/or 6.22",
        "Note_Reference": "",
        "Is_Range": ""
    },
    {
        "Name": "Demophilus",
        "Ethnicon": "",
        "Characterization": "historicus",
        "Note": "",
        "Work":"'Έφορος ἢ Δημόφιλος ὁ υἱὸς αὑτοῦ ἐν τῇ τριακοστῇ τῶν
 ἱστοριῶν",
        "Sub_Work": "",
        "Book": "6",
        "Casaubon_Reference": "6.232e",
        "Kaibel_Reference": "6.22",
        "Note_Reference": "",
        "Is_Range": ""
    },
    {

        "Name": "Mnesiptolemus",
```

---

69 http://www.digitalathenaeus.org/tools/MeinekeIndexScriptorum/api.php

70 http://digitalathenaeus.org/tools/MeinekeIndexScriptorum/api.php?what=historicus&w
   here=Characterization&exact=no

```
        "Ethnicon": "",
        "Characterization": "historicus",
        "Note": "Seleuci hilaroedi pater, plurimum valens apud Antiochum
    Magnum",
        "Work": "",
        "Sub_Work": "",
        "Book": "15",
        "Casaubon_Reference": "15.697d",
        "Kaibel_Reference": "15.53",
        "Note_Reference": "",
        "Is_Range": ""
    },
    {
        "Name": "Mnesiptolemus",
        "Ethnicon": "",
        "Characterization": "historicus",
        "Note": "Seleuci hilaroedi pater, plurimum valens apud Antiochum
    Magnum",
        "Work": Ἱστορίαι"",
        "Sub_Work": "",
        "Book": "10",
        "Casaubon_Reference": "10.432b",
        "Kaibel_Reference": "10.39 and/or 10.40",
        "Note_Reference": "",
        "Is_Range": ""
    },
    {
        "Name": "Mnesiptolemus",
        "Ethnicon": "",
        "Characterization": "historicus",
        "Note": "Seleuci hilaroedi pater, plurimum valens apud Antiochum
    Magnum",
        "Work": Ἱστορίαι"",
        "Sub_Work": "",
        "Book": "10",
        "Casaubon_Reference": "10.432c",
        "Kaibel_Reference": "10.40",
        "Note_Reference": "",
        "Is_Range": ""
    }
]
```

The *Index Scriptorum* of Meineke includes the following 749 unique expressions to refer to author names and their *ethnica* cited by Athenaeus in the *Deipnosophists*:[71]

Acesias, Acestius, Achaeus Eretriensis, Adaeus Mytilenaeus, Adrantus, Aegimius, Aelius Asclepiades, Aeschines, Aeschrio Samius, Aeschylides, Aeschylus Alexandrinus, Aeschylus Atheniensis, Aethlius Samius, Agallis Corcyraea, Agatharchides Cnidius, Agathocles, Agathocles Atracius, Agathocles Babylonius, Agathocles Cyzicenus, Agathon, Agelochus (nunc Amphilochus), Agias, Agis, Aglaosthenes, Agnon, Alcaeus, Alcaeus ὁ Μυτιληναῖος, Alcetas, Alcidamas Elaeensis, Alcimus Siculus, Alciphron Maeandrius, Alcman, Alexamenus Teius, Alexander, Alexander Aetolus, Alexander Myndius, Ἀλέξου, Alexinus, Alexis, Alexis Samius, Alexon, Amaranthus Alexandrinus, Amerias Macedo, Amipsias, Ammonius, Amphicrates, Amphilochus, Amphion Thespiensis, Amphis, Amyntas, Anacreon, Anagallis, Ananius, Anaxagoras, Anaxandrides, Anaxilas, Anaximander, Anaximenes Lampsacenis, Anaxippus, Andreas, Andreas Panormitanus, Andriscus, Androcydes, Andron, Andron Alexandrinus, Androsthenes, Androtion, Anicetus, Anonymi poetae, Antheae Lindii, Anthippus (?), Anticlides Atheniensis, Antidotus, Antigonus Carystius, Antimachus Colophonius, Antiochus Alexandrinus, Antipater Tarsensis, Antiphanes, Antiphon, Antisthenes, Apellas, Apion Alexandrinus, Apollodorus, Apollodorus (Adramyttenus), Apollodorus Atheniensis, Apollodorus Carystius, Apollodorus Gelous, Apollodorus Cyrenaeus, Apollonius, Apollonius Rhodius, Apollophanes, Araros, Aratus, Archagathus, Archedicus, Archelaus Chersonesita, Archemachus, Archestratus, Archestratus Gelous, Archilochus, Archimeli, Archippus, Archytas, Archytae aut Euphorionis, Arctinus aut Eumelus Corinthius, Ariphron Sicyonius, Aristagoras, Aristarchus, Aristeas, Aristias, Aristias Phliasius, Aristides, Aristippus, Aristo Ceus, Aristobulus Casandrensis, Aristocles, Aristocrates, Aristodemus, Aristogiton, Aristomenes, Aristomenes Atheniensis, Aristonicus, Aristonymus, Aristophanes, Aristophanes Byzantius, Aristophon, Aristoteles, Aristoxenus, Aristus Salaminius, Artemidorus, Artemidorus Ephesius, Artemo Casandrensis, Asclepiades, Asclepiades Aegyptius, Asclepiades Myrleanus, Asclepiades Tragilensis, Asius Samius, Asopodorus Phliasius, Aspasiae, Astydamas, Athanis, Athenaeus, Athenion, Athenocles Cyzicenus, Athenodorus, Athenogenes (Diogenes?), Autocrates, Axionicus, Axiopistus, Baeton, Bacchylides, Basilis, Bato, Bato Sinopensis, Bion Borysthenites, Bion Proconnesius?, Bion Solensis, Biton, Blaesus, Boeotus, Boeus, Botrys Messenius, Caecilius Argivus, Caecilius Calactinus, Calliades, Callias Atheniensis, Callias Mytilenaeus, Callias Syracusius, Callicrates, Callimachus Cyrenaeus, Callinus, Callisthenes, Callistratus, Callixenus Rhodius, Cantharus, Cantharus Τηρεύς, Capito Alexandrinus, Carcinus, Carystius Pergamenus, Castorion Solensis, Caucalus Chius, Cephalion, Cephalus, Cephisodorus, Cephisodorus Atheniensis, Cephisodorus Thebanus, Cercidas Megalopolitanus, Cercops Milesius, Chaereas, Chaeremon, Chaerephon Atheniensis, Chamaeleon Heracleota Ponticus, Chares Mytilenaeus, Charicles, Chariclides, Charon Lampsacenus, Chionides, Choerilus, Chrysippus Solensis, Chrysippus Tyaneus, Chrysogonus,

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71 This data has been extracted from the database fields `Author` and `Ethnicon` of the digital version of the *Index Scriptorum* of Meineke and is arranged in alphabetical order.

Cinesias, Cleanthes, Clearchus, Cleobulina Lindia, Cleomachus, Cleomenes, Cleomenes Rheginus, Cleostratus Tenedius, Clidemus, Clitarchus, Clitomachus Carthaginiensis, Clytus Milesius, Corinna, Cotta, Crates, Crates Thebanus, Cratinus, Creophylus, Critias, Crito, Crobylus, Ctesias Cnidius, Ctesibius Alexandrinus, Ctesicles, Ctesiphon Atheniensis, Cypria, Cyrenaeus, Daïmachus, Damon, Damon Atheniensis, Damoxenus, Demades, Demarete, Demetrius, Demetrius Byzantius, Demetrius Ixion, Demetrius Magnesius, Demetrius Phalereus, Demetrius Scepsius, Demetrius Troezenius, Demochares, Democlides, Democritus Abderita, Democritus Ephesius, Demodamas, Demon, Demonicus, Demophilus, Demosthenes, Dercylus, Dexicrates, Dicaearchus, Dicaearchus Messenius, Dicaeocles Cnidius, Didymus, Dieuches, Dieuchidas, Dinolochus, Dinon, Dio, Diocles Carystius, Diocles, Dioclides Abderita, Diodorus, Diodorus Siculus, Diodorus Sinopensis, Diodotus Erythraeus, Diogenes Babylonius, Diogenes, Dionysius, Dionysius Heracleota, Dionysius Leuctricus, Dionysius Samius, Dionysius Sinopensis, Dionysius Thrax, Dionysius Uticensis, Dionysodotus Lacedaemonius, Dioscorides, Dioscoridis, Diotimus Olympenus, Diotimus, Dioxippus, Diphilus, Diphilus Laodicensis, Diphilus Siphnius, Diyllus, Dorieus, Dorion, Dorotheus, Dorotheus Ascalonita, Dorotheus Sidonius, Dosiades, Draco Corcyraeus, Dromon, Duris, Duris Samius, Echemenes, Ecphantides, Empedocles, Empedus, Epaenetus, Eparchides, Ephippus, Ephippus Olynthius, Ephorus, Epicharmus, Epicrates, Epicurus, Epigenes, Epigenes (libri Epimenes), Epilycus, Epimenes, Epimenides Cretensis, Epinicus, Erasistratus, Eratosthenes, Eretriensis sive Erythraeus, Ergias (Erxias?) Rhodius, Eriphanis, Eriphus, Erxias (vide Ergias), Eualces, Euangelus, Euanthes, Euboeus Parius, Eubulus, Eucrates, Eudemus Atheniensis, Eudoxus Cnidius, Euemerus Cous, Eunor, Euenus Parius, Eumachus Corcyraeus, Eumachus Neapolitanus, Eumelus Corinthius, Eumenes Cardianus, Eumolpus, Eunicus, Euphantus, Euphorion Chalcidensis, Euphranor, Euphron, Euphronius, Eupolis, Euripides, Eurypylus, Euthias, Euthycles, Euthydemus Atheniensis, Euthymenes Massiliensis, Euxitheus, Galena Smyrnensis, Galenus Pergamenus, Glaucias, Glaucides, Glaucon, Glaucus Locrus, Gnathaena, Gnesippus, Gorgias Atheniensis, Gorgon, Hagnocles Rhodius, Hanno, Harmodius Lepreates, Harpocration Mendesius, Hecataeus Milesius, Hecataeus, Hedyle, Hedylus Samius aut Atheniensis, Hegemon Thasius, Hegesander Delphus, Hegesianax Alexandrinus, Hegesias, Hegesippus, Hegesippus Tarentinus, Hellanicus, Heliodorus Atheniensis, Heniochus, Hephaestion, Heracleon Ephesius, Heraclides, Heraclides Cumaeus, Heraclides Lembus, Heraclides Mopseates, Heraclides Ponticus, Heraclides Syracusanus, Heraclides Tarentinus, Heraclitus Ephesius, Heraclitus, Herinna, Hermeas, Hermeas Curiensis, Hermeas Samius, Hermeas Methymnaeus, Hermesianax Colophonius, Hermippus, Hermippus Cyzicenus, Hermippus Smyrnaeus, Hermocles, Hermogenes, Hermonax, Herodes Atticus, Herodianus Alexandrinus, Herodicus Babylonius, Herodicus Crateteus, Herodorus Heracleota Ponticus, Herodotus, Herodotus Lycius, Herondas, Heropythus, Hesiodus, Hicesius, Hieronymus, Hieronymus Cardianus, Hieronymus Rhodius, Hippagoras, Hipparchus, Hippasus, Hippias Erythraeus, Hippias, Hippocrates, Hippolochus Macedo, Hippon Rheginus, Hipponax, Hippys Rheginus, Homerus, Hybrias Cretensis, Hyperides, Hyperochus, Iason, Iatrocles, Ibycus Rheginus, Ichthyas Megaricus, Idomeneus Lampsacenus, Ion Chius, Isidorus Characenus, Isocrates, Ister, Iuba, Ixion,

Laches, Lamprocles, Lamynthius Milesius, Lasus Hermionensis, Leo, Leo Byzantius, Leonidas Byzantius, Leucon, Licymnius Chius, Lyceas Naucratita, Lycon Iasensis, Lycophron Chalcidensis, Lycophronides, Lycurgus, Lycus, Lynceus Samius, Lysanias Cyrenaeus, Lysias, Lysimachus, Lysimenes, Lysippus, Macareus, Machon patria Corinthius aut Sicyonius, Maeandrius, Magnes, Malacus, Marsyas, Matreas, Matris, Matron Pitaneus, Megacles, Megaclides, Megasthenes, Melanippides Melius, Melanthius, Meleager Gadarensis, Menaechmus Sicyonius, Menander, Menecles Barcaeus, Menesthenes, Menetor, Menippus, Menodorus, Menodotus Samius, Metagenes, Metrobius, Metrodorus, Metrodorus Chius, Metrodorus Scepsius, Mimnermus, Mithaecus, Mnasalces Sicyonius, Mnaseas Locrus aut Colophonius, Mnaseas Patrensis, Mnesimachus, Mnesiptolemus, Mnesitheus Atheniensis, Mochus Phoenicius, Moero Byzantia, Molpis Lacedaemonius, Moschina Atheniensis, Moschion, Moschus, Musaeus, Myron Prienensis, Myrsilus Lesbius, Nausiclides (?), Nausicrates, Neanthes Cyzicenus, Neocles Crotoniates, Neoptolemus Parianus, Nestor, Nicaenetus Samius, Nicander Chalcedonius, Nicander Colophonius, Nicander Thyatirenus, Nicandri, Nicanor Cyrenaeus, Nicias Nicaeensis, Nicobula, Nicochares, Nicocles Lacedaemonius, Nicolaus Damascenus, Nicomachus, Nicomedes, Nicomedes Acanthius, Nicon, Nicophon, Nicostratus, Nothippus, Numenius Heracleota, Nymphis Heracleota, Nymphodorus Syracusius, Oenopides Chius, Olympias, Ophelion, Oppianus Cilix, Orpheus, Pamphilus Alexandrinus, Panaetius Rhodius, Pancratis Alexandrini, Pancrates, Panyasis, Parmenio, Parmeniscus, Parmeno, Parmeno Byzantius, Parmeno Rhodius, Parthenius, Paxamus, Periander Corinthius, Persaeus Citiensis, Phaedimus, Phaestus, Phalaecus, Phanias Eresius, Phanocritus, Phanodemus, Pherecrates, Pherecydes Lerius, Pherenicus Heracleota, Philaenis Leucudia, Philemon, Philemon Atheniensis, Philetaerus, Philetas Cous, Philinus, Philippides, Philippi, Philippus, Philippus Theangelensis, Philiscus, Philistion Locrus, Phillis Delius, Philo, Philochorus, Philocles, Philocrates, Philomnestus, Philonides, Philostephanus Cyrenaeus, Philotimus, Philoxenus Alexandrinus, Philoxenus Cytherius, Philyllius, Phocylides, Phoenicides, Phoenix Colophonius, Phormus, Phrynichus, Phrynis, Phylarchus, Phylarchi (?), Pindarus, Pisander, Plato, Plistonicus, Plutarchus, Polemarchus, Polemo, Poliochus, Pollux Parianus, Polybius Megalopolitanus, Polycharmus Naucratita, Polycletus Larissaeus, Polycrates, Polycrates Atheniensis, Polyzelus, Polyzelus Rhodius, Posidippus, Posidonius, Posidonius Corinthius, Possis Magnesius, Pratinas, Praxilla Sicyonia, Promathidas Heracleota, Protagorides Cyzicenus, Proxenus, Ptolemaeus, Ptolemaeus Alexandrinus, Pylades, Pyres Milesius, Pyrgion, Pyrrhander, Pyrrho Eleus, Pythaenetus, Pythagoras, Pytheas, Pythermus Ephesius, Pythermus Teius, Pytho Catanaeus aut Byzantinus, Quintilii fratres, Rhianus, Rhinthon, Rutilius Romanus, Sacadas Argivus, Salpa Lesbia, Sanchoniathon, Sannyrion, Sappho, Satyrus, Scamon, Sclerias Tarentinus, Scylax, Scythinus Teius, Seleucus, Seleucus Tarsensis, Semus Delius, Silenus, Silenus Calactinus, Simaristus, Simias Rhodius, Simonactides, Simonides Amorgius, Simonides Ceus, Simus Magnes, Socrates, Socrates Cous, Socrates Rhodius, Socratem, Solon, Sopater Paphius, Sophilus, Sophocles, Sophron, Sosibius Laco, Sosicrates, Sosicrates Phanagorita, Sosicrates Rhodius, Sosipater (Sopater?), Sosiphanes, Sosippus, Sositheus, Sostratus, Sotades, Sotades Maronita, Sotion Alexandrinus, Speusippus, Sphaerus, Sphodrias, Staphylus Naucratita,

Stasinus, Sthenelus, Stesichorus Himeraeus, Stesimbrotus Thasius, Stilpo, Strabo, Strato, Strattis, Suniaethon, Sylla, Taenarus, Teleclides, Telephanes, Telesilla Argiva, Telestes Selinuntius, Terpsicles, Terpsion, Teucer, Thales Milesius, Thaletas, Themison, Themistagoras Ephesius, Theocles, Theocritus Chius, Theocritus Syracusius, Theodectes Phaselita, Theodoridas Syracusius, Theodorus, Theodorus Colophonius, Theodorus Hieropolitanus, Theognetus, Theognis Megarensis, Theognis, Theolytus Methymnaeus, Theophilus, Theophrastus, Theopompus, Theopompus Chius, Theopompus Colophonius, Theotimus, Thrasymachus Chalcedonius, Thucydides, Timachidas Rhodius, Timaeus Tauromenita, Timarchus, Timocles, Timocrates Lacedaemonius, Timocreon Rhodius, Timomachus, Timon Phliasius, Timotheus, Timotheus Milesius, Tryphon Alexandrinus, Tyndarichus Sicyonius, Varro, Xanthus, Xanthus Lydus, Xenarchus, Xenocrates Chalcedonius, Xenodemus, Xenophanes Colophonius, Xenophon, Zenis sive Zeneus Chius, Zeno Citiens, Zenodotus, Zenophanes, Zopyrinus.

The following 1,832 Greek and Latin unique expressions have been extracted from the *Index Scriptorum* of Meineke as referring to work titles:[72]

Ὀψαρτυτικά - Ἆθλοι - Αἴθων σατυρικός - Ἀλκμαίων ὁ σατυρικός - Ἥφαιστος σατυρικός - Ἶρις σατυρική - Κύκνος - Λίνος - Μοῖραι - Ὀμφάλη - περὶ διαθέσεως - περὶ ἀγαλματοποιῶν - περὶ τῶν παρὰ Θεοφράστῳ ἐν τοῖς περὶ ἠθῶν καθ᾽ ἱστορίαν καὶ λέξιν ζητουμένων - περὶ τῶν ἐν τοῖς Ἠθικοῖς Νικομαχείοις Ἀριστοτέλους - Πλακουντοποιικὰ συγγράμματα - Στέφανοι - κατὰ Τιμάρχου λόγος - eius dialogi - Ἀλκιβιάδης - Ἀξίοχος - Ἀσπασία - Καλλίας - Τηλαύγης - Ἴαμβοι - Γεωργικά - Ἀμφιτρύων - Μεσσηνιακὰ ἔπη - Ἀγαμέμνων - Ἀθάμας - Ἀμυμώνη - Γλαῦκος πόντιος - Δαναΐδες - Ἑπτὰ ἐπὶ Θήβαις - Ἠδωνοί - Ἡλιάδες - Θεωροί - Ἰξίων - Κάβειροι - Κρῆσσαι - Λυκοῦργος - Μυρμιδόνες - Νεανίσκοι - Ὀστολόγοι - Περραιβίδες - Πέρσαι - Προμηθεὺς δεσμώτης - Προμηθεὺς λυόμενος - Πρωτεὺς τραγικός - Σφίγξ - Φιλοκτήτης - Φινεύς - Φορκίδες - Φρύγες - epigramma quod sepulcro suo inscriptum voluit Aeschylus - Σαμίων ὅροι - Ἀσιατικά - Εὐρωπαϊκά - Ἱστορίαι - Ἁλιευτικά - περὶ Κυζίκου - eius isocola et antitheta - Θυέστης - Τήλεφος - Ἀργολικά - eius aliquod carmen Οἶνος, ὦ φίλε παῖ, καὶ ἀλήθεια - Ἀδελφαὶ μοιχευόμεναι - Γανυμήδης - Ἱερὸς γάμος - Καλλιστώ - Παλαίστρα - ἐν Παλαίστραις - περὶ τῶν ἐν Δελφοῖς ἀναθημάτων - Ἐγκώμιον Ναΐδος τῆς ἑταίρας - ἐν τῇ ἐπιγραφομένῃ τῶν βίβλων Ἰταλικῇ - Σικελικά - Ἁλιεύς - Ἐλεγεῖον - Ἰωνικὰ ποιήματα - Κρίκα - Πότος - Τιγόνιον - Ἀγήν - Ἐπιστολαί - Κτηνῶν ἱστορία - περὶ ζῴων - περὶ τῆς τῶν πτηνῶν ἱστορίας - περὶ πτηνῶν ζῴων - inde ducta videntur testimonia de attagene - de oto - de scope - de cygnis - de columbis - Παιὰν εἰς Κρατερὸν τὸν Μακεδόνα - περὶ αὐταρκείας - Ἀγωνὶς ἢ Ἱππίσκος - Ἀδελφοί - Αἴσωπος - Ἀλείπτρια - Ἄντεια - Ἀπεγλαυκωμένος - Ἀποκοπτόμενος - Ἀποκοπτομένη - Ἀρχίλοχος - Ἀσκληπιοκλείδης - Ἀσωτοδιδάσκαλος - Ἀτθίς - Βρεντία (?) - Γαλάτεια - Γραφή - Γυναικοκρατία - Δακτύλιος -

Δημήτριος - Δημήτριος ἢ Φιλέταιρος - Δίδυμοι - Δὶς πενθῶν - Δορκὶς Ποππύζουσα - Δραπέται - Δρωπίδης - Εἰσοικιζόμενος - Ἐκπωματοποιός - Ἑλένη - Ἑλληνίς - Ἐπίδαυρος - Ἐπίκληρος - Ἐπίτροπος - Ἐρετρικός - Ἔριθοι - Ζεὺς πενθῶν - Ἥ εἰς τὸ φρέαρ - Ἤπακος - Ἡσιόνη - Θεοφόρητος - Θηβαῖοι - Θράσων - Ἱππεύς - Ἱππίσκος - Ἵππος - Ἰσοστάσιον - Καταψευδόμενος - Κηρυττόμενος - Κλεοβουλίνη - Κνιδία - Κονιάτης - Κουρίς - Κρατεύας ἢ Φαρμακοπώλης - ἐν Φαρμακοπώλῃ ἢ Κρατεύα - ἐν Κρατεύα - Κυβερνήτης - Κυβευταί - Κύπριος - Λαμπάς - Λέβης - Λεβήτιον - Λευκαδία - Λευκαδία ἢ Δραπέται - Λεύκη - Λοκροί - Λυκίσκος - Μανδραγοριζομένη - Μάντεις - Μίδων - Μίλκων - Μιλησία - Μιλήσιοι - Μίνως - Μνηστῆρες - Νύμφαι - Ὀδυσσεὺς ὑφαίνων - Ὀλύνθιος - Ὁμοία - Ὀπώρα - Ὀρέστης - Ὀρχηστρίς - Παγκρατιαστής - Παμφίλη - Παννυχὶς ἢ Ἔριθοι - Παράσιτος - Ποιηταί - Ποιητής - Πολύκλεια - Πονήρα - Ποντικός - Ποππύζουσα - Πρωτόχορος - Πυθαγορίζουσα - Πυλαῖαι - Πύραυνος - Ῥόδιος ἢ Ποππύζουσα - Σκείρων - Στρατιώτης - Συναποθνήσκοντες - Συντρέχοντες - Σύντροφοι - Σώρακοι - Ταραντῖνοι - Τιτθή - Τοκιστὴς ἢ Καταφευδόμενος - Τροφώνιος - Τυνδάρεως - Ὕπνος - Ἄλεξις ἢ Ἀντιφάνης ἐν Ὕπνῳ - Ὑποβολιμαῖος - Φαῖδρος - Φαίδων ἢ Φαίδρια - Φαρμακοπώλης - Φιλέταιρος - Φιλίσκος - Φιλόκαλος ἢ Νύμφαι - Φιλοῦσα - Φρύξ - Φρυγίου διασκευή - Φυγάς - Χορηγίς - Ψευδόμενος (Καταψευδόμενος?) - Ψευδυποβολιμαῖος - Σαμίων ὥρων - περὶ αὐλῶν - περὶ σκηνῆς - Γλῶσσαι - Ῥιζοτομικός - Ἀποκοτταβίζοντες - Κατεσθίων (?) - Κόννος - Σφενδόνη - περὶ βωμῶν καὶ θυσιῶν - περὶ τῶν Ἀθήνησιν ἑταιρίδων - περὶ ἐνδόξων ἀνδρῶν - περὶ τοῦ ἐν Ἑλικῶνι μουσείου - Βαλανεῖον - Γυναικομανία - Διθύραμβος - Ἰάκειμος - Κουρίς - Λευκάς - Ὀδυσσεύς - Οὐρανός - Πάν - Πλάνος - Φιλάδελφοι - Σταθμοί - Σταθμῶν - ἐν Σταθμοῖς Περσικοῖς - τῶν τῆς Ἀσίας Σταθμῶν - Ἀνάνιος ἢ Ἱππῶναξ ἐν τοῖς ἰάμβοις - Φυσικοὶ - Ἀγροῖκοι - Ἀγχίσης - Αἰσχρά - Ἀντερῶν - Γεροντομανία - Διθύραμβον - Ἡρακλῆς - Θησαυρός - Κερκίον - Κυνηγέται - Μελίλωτος - Νηρεύς - Νηρηίδες - Ὀδυσσεύς - Ὁπλομάχος - Πάνδαρος - Πόλεις - Πρωτεσίλαος - Σαμία - Σανυρίας - Τηρεύς - Φαρμακομάντις - Φιαληφόρος - Αὐλητής - Εὐανδρία - Καλυψώ - Κίρκη - Λυροποιός - Μάγειροι - Μονότροπος - Νεοττίς - Ὀρνιθοκόμοι - Πλούσιοι - Ὑάκινθος - ἐν Ὑακίνθῳ πορνοβοσκῷ - Χάριτες - Χρυσοχόος - Ἡρωολογία - Βασιλέων μεταλλαγαί - Πρῶται ἱστορίαι - Κεραυνός - Κεραυνούμενος - Κιθαρῳδός - Φρέαρ - περὶ δακέτων - περὶ τῶν ψευδῶς πεπιστευμένων - Σικελικὰ κατὰ πόλιν - Ναξιακά - Χρονικά - τῆς Ἰνδικῆς παράπλους - Γεωργικός - Androtion aut Philippus aut Hegemon ἐν τῷ Γεωργικῷ - cantilena popularis - duo hexametri (Phocylidis?) - hexameter - duo hexametri - epigramma - hymnus in Dianam - hymnus atticus - ἐν Σφαττομένῳ - ἐν Φοινίσσαις - ἡ διὰ τῶν συνθέτων ὀνομάτων ποίησις - Ἐγκαλυπτόμενος - Νόστων - Ἐξηγητικός - Μεμψίμοιρος - Ἀντίπατρος - Βίοι - περὶ τοῦ Διονυσίου βίον τοῦ Ἡρακλεώτου, τοῦ ἐπικληθέντος Μεταθεμένου - Ζήνωνος βίος - Μενεδήμου βίος - περὶ λέξεως - Δέλτοι - Θηβαΐς - Θηβαΐδος - Λυδή - περὶ τῶν ἐν τῇ μέσῃ κωμῳδίᾳ κωμῳδουμένων ποιητῶν - περὶ δεισιδαιμονίας - περὶ ὀργῆς - Ἄγροικος ἢ Βονταλίων - ἐν Βουταλίωνι, ὅπερ δρᾶμα τῶν Ἀγροίκων ἐστὶν ἰνὸς διασκευή - ἐν Ἀγροίκῳ - ἐν Ἀγροίκοις - Αἴολος - Ἀκέστρια - Ἀκοντιζομένη - Ἀλιενομένη - Ἄλκηστις - Ἀνταῖος (?) - Ἀργυρίου ἀφανισμός - Ἀρκαδία - Ἀρκάς - Ἁρπαζομένη - Ἀρχιστράτη - Ἄρχων - Ἀσκληπιός - Αὐλητής - Αὐλητρὶς ἢ Δίδυμαι - Αὐτοῦ ἐρῶν - Ἀφροδίσιον - Ἀφροδίτης γοναὶ - Βάκχαι - Βοιωτία - Βομβύλιος - Βουταλίων - Γάμοι - Γάμος - Γανυμήδης - Γάστρων - Γόργυ-

θος - Δευκαλίων - Δίδυμαι - Διορύττων - Διπλάσιοι - Δραχεταγωγός - Δύσερως - Δύσπρατος - Δωδώνη - Ἑαυτοῦ ἐρῶν - Εὐθύδικος - Ζάκυνθος (Ζακύνθιος?) - Θαμύρας - Θομβύχιος (?) - Θορίχιοι - Θορίχιοι ἢ Διορύττων - Ἰατρός - Ἱππεῖς - Καινεύς - Κᾶρες - Κάρνη (?) - Κηπουρός - Κιθαριστής - Κνοιθιδεύς - Κνοιθιδεὺς ἢ Γάστρων - Κορινθία - Κονρίς - Κρῆτες - Κύκλωψ - Κώρυχος - Λάμπων - Λεπτινίσκος - (Λευχάς) - Λεωνίδης - Λήμνιαι - Λυδός - Λύχων - Μειλανίων - Μέτοιχος - Μητραγύρτης - Μισοπόνηρος - Μνήματα - Μοιχοί - Μύστις - Οἰνόμαος ἢ Πέλοψ - Ὅμοιαι - Ὅμοιοι - Ὁμοπάτριοι - Ὁμώνυμοι - Παιδεραστής - Παράσιτος - Παρεχδιδομένη - Παροιμίαι - Πέλοψ - Ποίησις - Προβατεύς - Προβλήματα - Προγονοι - Σαπφώ - Σκληρίαι - Σκύθης - Στρατιώτης ἢ Τύχων - Τίμων - Τραυματίας - Τριταγωνιστής - Τυρρηνός - Τύχων - Ὑδρία - Φιλοθήβαιος - Φιλομήτωρ - Φιλοπάτωρ - Φιλῶτις - Φρεάρριος - Χρυσίς - περὶ ἑταιρῶν - κατ᾽ Ἀκιβιάδου λοιδορίας - Πολιτικὸς λόγος - περὶ ταῶν - περὶ γεωργικῶν - Ἀρχέλαος - τῶν Κύρων ἅτερος - Πολιτικός - Προτρεπτικός - Σάθων - Φυσιογνωμονικός - περὶ τῆς Ἀπικίου τρυφῆς - περὶ τῆς Ῥωμαϊκῆς διαλέκτου - Παρθιχῶν - πρὸς τὴν Ἀριστοκλέους ἐπιστολὴν ἀντιγραφῇ - idem liber respicitur - περὶ ἐτυμολογιῶν - Ἐτυμολογιῶν - τῶν Ἐτυμολογουμένων - περὶ θεῶν - περὶ τοῦ κρατῆρος - περὶ νεῶν καταλόγου - περὶ Σώφρονος - Γραμματιδιοποιός - Ἱέρεια - Προικιζομένη ἱματιόπωλις - Σφαττομένη - Ἀποκαρτερῶν - Ἀπολιποῦσα - Φιλάδελφοι ἢ Ἀποκαρτερῶν - περὶ μύρων καὶ στεφάνων - περὶ θηρίων - περὶ ἑορτῶν - ἐν Τριηρικῷ - περὶ μύρων - Ἀργοναυτικά - περὶ Ἀρχιλόχου - περὶ Ναυκράτεως κτίσεως - περὶ τῶν Σωτάδου ποιημάτων - Δαλίς - Ἀρίστων - Ἄδωνις - Καμπυλίων - Ἀραρὼς ἢ Εὔβουλος ἐν Καμπυλίωνι - Πανὸς γοναί - Ὑμέναιος - Διαμαρτάνων - Θησαυρός - Ἰδιοφυῆ - Εὐβοϊκῶν - carmen epicum - ab aliis Γαστρονομία, ab aliis Ἡδυπάθεια, ab aliis Δειπνολογία, ab aliis Ὀψοποιά nominatur - Verum est Γαστρολογία - Γαστρονομία - Ἡδυπάθειαν nominat Lynceus Samius - Ὀψολογιά - carmen dicatum fuit Moscho - et Cleandro - praecepta sua ad Hesiodi aut Theognidis modum - ipsaque illa praecepta χρύσεα ἔπη - περὶ αὐλητῶν - Ἐλεγεῖα - Τετράμετροι - περὶ Ἀρχιλόχου scripsit Apollonius Rhodius - περὶ τῆς παρ᾽ Ἀρχιλόχῳ ἀχνυμένης σκυτάλης scripsit Aristophanes grammaticus - epigramma in navem Hieronis - Ἀμφιτρύων δεύτερος - Ἡρακλῆς γαμῶν - Ἰχθῦς - Ῥίνων - Γέρανος - Τιτανομαχίας - Παιὰν εἰς Ὑγίειαν - Μαμμάκυθος - Ἀριστάρχεια δόγματα - περὶ κιθαρῳδῶν - Κῆρες - περὶ παροιμιῶν - Διατριβαί - Ἐρωτικὰ Ὅμοια - Λακώνων Πολιτείας - περὶ μουσικῆς - περὶ χορῶν - Ex his libris est - Λακωνικῶν - Γελοῖα ἀπομνημονεύματα - περὶ Πινδάρου - κατὰ Φρύνης λόγος - Γόητες - Διόνυσος - Τῶν περὶ τὰς ἱερουργίας - Ἥλιος ῥιγῶν - Θησεύς - Ἀττικαὶ λέξεις - περὶ τῆς (παρ᾽ Ἀρχιλόχῳ) ἀχνυμένης σκυτάλης σύγγραμμα - Γλῶσσαι Λακωνικαί - περὶ τῶν Ἀθήνησιν ἑταιρέδων - περὶ ἡλικιῶν - πρὸς τοὺς Καλλιμάχον πίνακας - περὶ προσώπων - Αἰολοσίχων - Αἰολοσίχων δεύτερος - Ἀμφιάραος - Ἀνάγυρος - Ἀχαρνῆς - Βαβυλώνιοι - Βάτραχοι - Γεωργοί - Γῆρας - Γηρυτάδης - Δαίδαλος - Δαιταλεῖς - Δηλία (?) - Δράματα ἢ Νίοβος - ἐν Δράμασι - ἐν τοῖς Δράμασι - ἐν δευτέρῳ Νιόβῳ - Εἰρήνη - Ἐκκλησιάζουσαι - Ἥρωες - Θεσμοφοριάζουσαι δεύτεραι - τὰς δευτέρας Θεσμοφοριαζούσας - Κένταυρος - Κώκαλος - Λήμνιαι - Λυσιστράτη - Νεφέλαι - ἐν προτέραις Νεφέλαις - δεύτεραι Νεφέλαι - Νῆσοι - Νίοβος - Ὁλκάδες - Ὄρνιθες - Πελαργοί - Πλοῦτος - Πλοῦτος δεύτερος - Πόλεις - Ἀριστοφάνης ἢ Φιλύλλιος ἐν ταῖς Πόλεσιν - Προαγών - Σκευαί - Σκηνὰς καταλαμβάνουσαι - Σφῆκες - Ταγηνισταί - Τελμισσεῖς - Τριφάλης - Φοίνισσαι - Ὧραι -

Καλλωνίδες - Πειρίθοος - Πλάτων - Πυθαγοριστής - Φιλωνίδης - Ἀπολογία τῆς ἀσεβείας - Εἰς Ἑρμείαν τὸν Ἀταρνέα ᾆσμα ἢ σκόλιον - Ἐρωτικῶν - περὶ εὐγενείας - Ζώων ἱστορία, ad quod opus conficiendum DCCC talenta ab Alexandro accepisse perhibetur Aristoteles - ζώων ἱστορίας - ἐν τῷ περὶ τῶν ζώων ἠθῶν - περὶ ζώων μορίων - ζώων μορίων - μορίων - ἐν τῷ περὶ ζώων μορίων - ἐν τῷ περὶ ζώων - ἐν τοῖς περὶ ζώων - ἐν τῷ περὶ ζωϊκῶν - ἐν τῷ ἐπιγραφομένῳ ζωϊκῷ - ἐν τῷ περὶ ζώων ἢ ἰχθύων - ἐν τῷ περὶ ζωϊκῶν καὶ ἰχθύων - ἐν τῷ περὶ ἰχθύων - Ἠθικὰ Νικομάχεια - Θαυμάσια - περὶ μακροβιότητος - περὶ μέθης - περὶ ποιητῶν - Πολιτεῖαι - Συμπόσιον - Συμποτικοὶ νόμοι - Ὑπομνήματα - περὶ φυτῶν - ὁ Ἀρχύτα βίος - περὶ αὐλῶν καὶ ὀργάνων - περὶ αὐλῶν τρήσεως - Πολιτικῶν νόμων - Συγκρίσεων - Σύμμικτα συμποτικά - τὰ κατὰ βραχὺ ὑπομνήματα - Γλῶσσαι ὀψαρτυτικαί - Ὀψαρτυτικαὶ λέξεις - περὶ Δωρίδος - Γεωγραφούμενα - Ἰωνικὰ ὑπομνήματα - περὶ συναγωγῆς βιβλίων - περὶ βιβλίων χρήσεως - περὶ Διονυσιακοῦ συστήματος - Αἰγυπτιακῶν - περὶ Δημητρίου τοῦ Φαληρέως σύγγραμμα - περὶ Κρατίνου - περὶ τῆς Νεστορίδος - Τραγῳδούμενα - Ἔπη - τὰ περὶ τὸν Ἔρωτα - οἱ καταλογάδην ἴαμβοι - Ἑρμῆς - Ἡρακλῆς σατυρικός - Σικελικῶν - περὶ τῶν παρ' Ἀρχίππου θραττῶν - περὶ τῶν τῆς Συρίας βασιλέων - Σαμόθρακες - περὶ σπουδῆς καὶ παιδιᾶς - Κεφαλίων - Ἀτρειδῶν καθόδου auctor - Ἀχαϊκά - Φιλευριπίδης - Φίλιννα - Χαλκιδικός - Κανὼν καὶ Γνῶμα - Σταθμοὶ τῆς Ἀλεξάνδρου πορείας - Ἐρωτικά - Ἰνδικῶν - περὶ τῶν ἐν Ἐφέσῳ τυράννων - περὶ Θεσσαλίας καὶ Αἱμονίας - περὶ τῆς τοῦ Ἱερωνύμου τυραννίδος - περὶ Ἴωνος τοῦ ποιητοῦ - Ἀνδροφόνος - Εὐεργέται - Συνεξαπατῶν - Βαβυλωνιακῶν - Αἰθιοπικά - περὶ ὀργάνων πρὸς Ἄτταλον - Μεσοτρίβας - Σατοῦρνος - Παρῳδίαι - Ὀρνιθογονία - περὶ τῶν δουλικῶν πολέμων - περὶ ἱστορίας - Ἄγνοια (fabula ab aliis ad Diphilum relata) - Γραμματικὴ τραγῳδία - Κύκλωπες - Καλλίας ἢ Διοκλῆς ἐν Κύκλωψι - Πεδῆται - περὶ τῆς παρ' Ἀλκαίῳ λεπάδος - τῶν περὶ Ἀγαθοκλέα ἱστοριῶν - Μοσχίων - Ἐθνικαὶ ὀνομασίαι - Ἑκάλη - Ἐπιγράμματα - Ἐπινίκιον ἐλεγειακῶν εἰς Σωσίβιον - Ἱστοριακὰ ὑπομνήματα. Καλλίμαχος ἢ Ζηνόδοτος ἐν ἱστορικοῖς ὑπομνήμασι - περὶ ὀρνίθων - περὶ ὀρνέων - Πίναξ παντοδαπῶν συγγραμμάτων - τῶν νόμων πίναξ - τῶν ῥητορικῶν ἀπογραφή - Ἑλληνικά - περὶ τοῦ ἱεροῦ πολέμου - Θραττῶν Κρατίνου ὑπομνήματα - Συμμίκτων - περὶ Ἀλεξανδρείας - Πλάτων ἢ Κάνθαρος ἐν τῇ Συμμαχίᾳ - πρὸς Φιλόπαππον ὑπομνημάτων - Ἀχιλλεύς - Σεμέλη - περὶ διδασκαλιῶν - Ἱστορικὰ ὑπομνήματα - περὶ Σωτάδου - εἰς Πᾶνα ποίημα - Ἡρακλέους ἐγκώμιον - τῆς Λαγίδος ἐγκώμιον - Ἀμαζόνες - Ὗς - κατὰ Ἀριστοτέλους βιβλία τέσσαρα - Αἰγίμιος - Ἀλφεσίβοια - Ἰώ - Μινύαι - Οἰνεύς - Δεῖπνον - περὶ Αἰσχύλου - περὶ Ἀνακρέοντος - περὶ ἡδονῆς - Θεόφραστος ἢ Χαμαιλέων ἐν τῷ περὶ ἡδονῆς - περὶ κωμῳδίας - περὶ τῆς ἀρχαίας κωμῳδίας - περὶ Λάσου - περὶ Σαπφοῦς - περὶ Στησιχόρου - περὶ Σιμωνίδου - αἱ περὶ Ἀλέξανδρον ἱστορίαι - Χάρης ἐν ταῖς ἱστορίαις - περὶ τοῦ ἀστικοῦ ἀγῶνος - Ἀλύσει - Περσικά - Ὧροι - Πτωχοί - περὶ τῶν δι' αὐτὰ αἱρετῶν - περὶ τῶν μὴ δι' αὐτὰ αἱρετῶν - Εἰσαγωγὴ ἢ περὶ ἀγαθῶν καὶ κακῶν πραγματεία - περὶ καλοῦ καὶ ἡδονῆ - περὶ τοῦ καλοῦ - περὶ ὁμονοίας - Ἀρτοκοπικός - Ἀρτοποιικός - Πολιτεία - περὶ μεταλήψεως - Μυθικά - Βίοι sive περὶ βίων - Γεργίθιος - περὶ γρίφων - περὶ τῶν ἐνύδρων - idem liber fortasse περὶ τῶν ἐν τῷ ὑγρῷ - περὶ θινῶν - περὶ νάρκης - περὶ παιδείας - περὶ τοῦ πανικοῦ - περὶ τῶν ἐν τῇ Πλάτωνος Πολιτείᾳ μαθηματικῶς εἰρημένων - περὶ σκελετῶν - περὶ φιλίας - Γλώσσας scripsit Clearchus, si vera scriptura - Κορίνθιοι - Πάνδροσος -

Αἰνίγματα - Ἐπιστολὴ πρὸς Ἀλέξανδρον - Διθύραμβος Μελέαγρος - Ἀστρολογία - Νόστοι - Πρωτογόνεια - Γλῶσσαι - ἐν τῇ περὶ Γλωσσῶν πραγματείᾳ - περὶ Μιλήτου - περὶ τῆς Ῥωμαίων πολιτείας - Ἀττικὴ διάλεκτος - περὶ τῆς Ἀττικῆς λέξεως - Γείτονες - Θηρία - Λάμια - Παιδιαί - Ῥήτορες - Σάμιοι - Συναριστῶσαι - Τόλμαι - Ἀρχίλοχοι - Βουκόλοι - Δηλιάδες - Διονυσαλέξανδρος - Δραπέτιδες - Εὐνεῖδαι - Θρᾶτται - Κλεοβουλῖναι - Μαλθακοί - Νέμεσις - Νόμοι - Ὀδυσσῆς - Πλοῦτοι - Πυτίνη - Τροφώνιος - Χείρωνες - Γίγαντες - Θηραμένης - Τιτάνες (?) - Χείρων - Ἐφεσίων Ὧροι - versus in laudem Anacreontis - Πειρίθους tragoedia, quae ab aliis Critiae, ab aliis Euripidi tribuitur - Θετταλῶν πολιτεία - Λακεδαιμονίων πολιτεία - Φιλοπράγμων - Ἀπαγχόμενος - περὶ τῶν κατὰ τὴν Ἀσίαν φόρων - περὶ τῆς ὑδραύλεως - Χρονικὰ sive Χρόνοι - carmina - Ἰνδικά - περὶ Βυζαντίου - Αὑτὸν πενθῶν - Τρίφυλλον - περὶ ποιημάτων - Ἀρεοπαγίτης - Σικελία - περὶ τῆς Ἀλεξανδρέων διαλέκτου - Ἐτυμολογούμενα - ἐν Ἐτυμολογίᾳ - Τρωικὸς διάκοσμος - περὶ τῶν κατ᾽ Αἴγυπτον - ὑπὲρ Σοφοκλέους πρὸς Φίλωνα - περὶ τῶν ἐν Ἅιδου - Μέγας διάκοσμος - de templo Dianae Ephesiae - περὶ Ἁλικαρνασσοῦ - Ἀτθίδος - Ἀχελῷος - Ἔφορος ἢ Δημόφιλος ὁ υἱὸς αὐτοῦ ἐν τῇ τριακοστῇ τῶν ἱστοριῶν - κατὰ Ἀνδροτίωνος - περὶ ἀτελειῶν - κατὰ Εὐέργου καὶ Μνησιβούλου - ὑπὲρ Κτησιφῶντος - κατὰ Μειδίου - κατὰ Νεαίρας - περὶ τῆς παραπρεσβείας - περὶ τοῦ στεφάνου - πρὸς Τιμόθεον ὕβρεως - Φιλιππικοί - περὶ χρυσίου - ὑφ᾽ ἑαυτῶν πλανώμενοι - περὶ Ἀλκαίου - περὶ τοῦ τῆς Ἑλλάδος βίου - περὶ τῆς ἐν Ἰλίῳ θυσίας - Ὀλυμπικός - Τριπολιτικός - περὶ τῆς εἰς Τροφωνίου καταβάσεως - Διατριβαί - Ἐξηγητικὸς τῶν Ἴωνος δραμάτων - αἱ πρὸς Ἴωνα ἀντεξηγήσεις - περὶ παρεφθορυίας λέξεως - τῶν Φρυνίχου δραμάτων ἐξήγησις - Μεγαρικά - Τήλεφος - Ὑγιεινά - Ὑγιεινῶν - τῶν πρὸς Πλείσταρχον Ὑγιεινῶν - ἐν τοῖς πρὸς Πλείσταρχον - περὶ θανασίμων φαρμάκων - Θάλαττα - Κύκλωπες. Καλλίας ἢ Διοκλῆς ἐν Κύκλωψι - Μέλισσαι - Γλῶσσαι Ἰταλικαί - πρὸς Λυκόφρονα - περὶ βιβλιοθήκης - Αὐλητρίς - Ἐφημερίδες Ἀλεξάνδρου - περὶ νόμων - πρὸς Ἀθηναίους λόγος - Ἐξήγησις τοῦ Θεοδωρίδα μέλους εἰς τὸν Ἔρωτα - περὶ διαλέκτων - περὶ τοῦ Κύκλου - Ἐπιστολαὶ πρὸς Σπεύσιππον - Ἀκοντιζόμενος - Θεσμοφόρος - Σώζουσα - περὶ ὀνομάτων - Γεωργικῶν - Ὀψαρτυτικός - Παιᾶνες - οἱ παρ᾽ Ὁμήρῳ Νόμοι - Πολιτεία Λακεδαιμονίων - epigramma in Machonem omisso auctoris nomine allatum - Ἡράκλεια - Ἀντιπορνοβοσκός - Ἱστοριογράφος - Φιλάργυρος - Ἄγνοια - Δίφιλος ἢ Καλλιάδης ἐν Ἀγνοίᾳ - Αἱρησιτείχης - Ἀνασωζόμενοι - Ἄπληστος - Δίφιλος ἢ Σώσιππος ἐν Ἀπολιπούσῃ - Βοιώτιος - Γάμος - Διαμαρτάνουσα - Ἑκάτη - Ἑλενηφοροῦντες - Ἔμπορος - Ἐναγίζοντες - Εὐνοῦχος ἢ Στρατιώτης - Ζωγράφος - Ἥρως - Θησεύς - Μνημάτιον - Παιδερασταί - Πελιάδες - Πιθραύστης (Τιθραύστης?) - Πολυπράγμων - Συνωρίς - dramatis nova editio - Τελεσίας - περὶ τῶν Νικάνδρου Θηριακῶν - περὶ τῶν προσφερομένων τοῖς νοσοῦσι καὶ τοῖς ὑγιαίνουσι - ex eodem libro dycta sunt reliqua testimonia - scripsit epigramma in Milonem Crotoniatam - περὶ ἰχθύων - περὶ Ἀλέξανδρον ἱστορίαι - περὶ Ἀντιφάνους καὶ περὶ τῆς παρὰ τοῖς νεωτέροις κωμικοῖς ματτύης - Λέξεως συναγωγή - Κρητικά - περὶ λίθων - Ψάλτρια - περὶ τραγῳδίας - τὰ περὶ Ἀγαθοκλέα vel αἱ περὶ Ἀγαθοκλέα ἱστορίαι - περὶ Εὐριπίδου καὶ Σοφοκλέους - Μακεδονικά - Σάτυροι - Καθαρμοί - Ἀπομνημονεύματα - Ἄρτεμις - Βούσιρις - Γηρυόνης - Ἐμπολή - Ἔφηβοι - Κύδων - Ναυαγός - Ὀβελιαφόροι - Ὅμοιοι ἢ Ὀβελιαφόροι - Πελταστής - Φιλύρα - περὶ τῆς Ἀλεξάνδρου καὶ Ἡφαιστίωνος ταφῆς vel μεταλλαγῆς vel τελευτῆς - Εὑρήματα - περὶ εὑρη-

μάτων - Ἀγρωστῖνος - Ἀλκυών - Ἀταλάνται - Βάκχαι - Γᾶ καὶ θάλασσα - Διόνυσοι - Ἐλπὶς ἢ Πλοῦτος - Ἑορτά - Ἥβας γάμος - Θεαροί - Κωμασταί - Λογος καὶ Λόγιννα - Μεγαρίς - Μοῦσαι (διασκευὴ Ἥβας γάμου) - Νᾶσοι - Ὀδυσσεὺς αὐτόμολος - Ὀδυσσεὺς ναυαγός - Ὀρύα - Περίαλλος - Πύρρα καὶ Προμαθεύς - Πύρρα - Σειρῆνες - Ψευδεπιχάρμεια scripta Πολιτεία, Κανών, Γνῶμαι - περὶ Ἐπιχάρμου scripsit Apollodorus Atheniensis - Ἀντιλαῖς - περὶ ἐπιτηδευμάτων ἐπιστολή - πρὸς Ἕρμαρχον ἐπιστολαί - Κανών - περὶ τέλους - Ἀργυρίου ἀφανισμός - Βακχεία - Ἡρωίνη - Κωραλίσκος - ἡ Τελχινιακὴ ἱστορία - Ὑποβαλλόμεναι - Μνησιπτόλεμος - ἡ περὶ τῶν καθόλου πραγματεία - Ἀντερινύς - Ἀρσινόη - Ἐπιστολαί - πρὸς Ἀγήτορα τὸν Λάκωνα ἐπιστολή - in Eratosthenis Ἑρμῆν commentarii Timarchi - Ὀλυμπιονῖκαι - τὰ περὶ πατρίδος (περὶ Ῥόδου) - Μελίβοια - Κολοφωνιακά - Ἐφεσιακά - Ἀνακαλυπτομένη - εἰς τὸν Γλαῦχον ὕμνος - Παρῳδιᾶν βιβλία τέττασα - Ἀγκυλίων - Ἀμαλθεία - Ἀντιόπη - Ἄστυτοι - Αὔγη - Βελλεροφόντης - Γλαῦκος - Διονύσιος - Δόλων - Εὐρώπη - Ἠχώ - Ἴων - Κατακολλώμενος - Κέρκωπες - Κλεψύδρα - Λάκωνες ἢ Λήδα - Λήδα - Μήδεια - Μυλωθρίς - Μυσοί - Νάννιον - Ναυσιχάα - Ὀδυσσεὺς ἢ Πανόπται - Οἰδίπους - Οἰνόμαος ἢ Πέλοψ - Ὀλβία - Ὀρθάνης - Πάμφιλος - Παννυχίς - Πανόπται - Πορνοβοσκός - Προκρίς - Προσουσία ἢ Κύκνος - Σεμέλη ἢ Διόνυσος - Στεφανοπώλιδες - Σφιγγοκαρίων - Τιτθαί - Τιτᾶνες - Φοῖνιξ - Χάριτες - Χρυσίλλα - περὶ λαχάνων - Γῆς περίοδος - Ἱερᾶς ἀναγραφῆς βιβλία - αἱ περὶ Ἀννίβαν ἱστορίαι - Τιτανομαχία - Ephemerides Alexandri - Ἄντεια. Εὐνίκου ἢ Φιλυλλίου Ἄντεια - Πόλεις. Φιλύλλιος ἢ Εὔνικος ἢ Ἀριστοφάνης ἐν Πόλεσι - Ἀποδιδοῦσα - Γέρανος. Εὐφορίων ἢ Ἀρχύτας ἐν Γεράνῳ - περὶ Ἰσθμίων - Ἱστορικὰ ὑπομνήματα - περὶ μελοποιῶν - Χιλιάδες - Αἰσχρά - Μοῦσαι - Παραδιδομένη - Συνέφηβοι - Αἶγες - Ἀστράτευτοι - Αὐτόλυκος - Βάπται - Δῆμοι - Εἴλωτες - Κόλακες - Μαρικοῖς - Προσπάλτιοι - Ταξίαρχοι - Φίλοι - Χρυσοῦν γένος - Euripideus versus videtur esse - (Αἴολος) - (Ἀνδρομάχη) - Ἀνδρομέδα - Αὐτόλυκος πρῶτος - (Βελλεροφόντης) - (Δανάη) - Δεσμῶτις Μελανίππη - Εὐρυσθεύς - Ἱκέτιδες - Ἱππόλυτος - (Ἰφιγένεια ἐν Αὐλίδι) - Κύκλωψ - Μελανίππη - (Οἰδίπους) - Πειρίθους - Πλεισθένης - Σθενέβοια - Σκίρων - (Τήλεφος) - (Τρωάδες) - Φαέθων - (Φοίνισσαι) - Φρίξος - carmen epinicium Euripidis in Alcibiadem curru victorem Olympiae - epigramma in matrem quandam cum liberis ex fungorum esu mortuam - Ἄσωτοι ἢ Ἐπιστολή - Ὀψαρτυτικά - περὶ ταρίχων - Νόμος συσσιτικός - περὶ τῶν Ἀθήνησιν ἑταιρίδων sive περὶ ἑταιρῶν - περὶ τῶν ἐν Ῥόδῳ θυσιῶν - Κορωνισταί - Ἄννωνος πλάναι - περὶ τῶν κατὰ Φιγάλειαν νομίμων - περὶ τῶν παρὰ Φιγαλεῦσι νομίμων - περὶ πλακούντων - Γενεαλογίαι - Περιήγησις (sive Περιηγήσεις) - Περιήγησις - Ἀσίας Περιήγησις - Ἀσία - Εὐρώπης περίοδος - Σκύλλα - Γιγαντομαχία - Ὑπόμνημα ἀνδριάντων καὶ ἀγαλμάτων - Ποιήματα - Τρωικά. ὁ τὰ Κεφαλίωνος ἐπιγραφόμενα Τρωικὰ συνθεὶς Ἡγησιάναξ ὁ Ἀλεξανδρεύς - Κύπρια ἔπη - Φιλέταιροι - Πλακουντοποιικὸν σύγγραμμα - Αἰγυπτιακά - Ἀνάβασις εἰς Ἄμμωνος (εἰ γνήσιος) - Δευκαλιωνεία - Ἐθνῶν ὀνομασίαι - Καρνεονῖκαι - Κτίσεις - Φορωνίς - περὶ ἀκροπόλεως - Γοργόνες - Πολύευκτος - Τρόχιλος - περὶ τοῦ λυγίνου παρ' Ἀνακρέοντι στεφάνου - περὶ τοῦ παρὰ Ξενοφῶντι ἐν τοῖς Ἀπομνημονεύμασιν Ἀντιφῶντος - ἐν Ξενίζοντι - περὶ δικαιοσύνης - περὶ ἐρωτικῶν - scripsit λέσχας, πυρρίχας et φλυαρίας - περὶ θεσμῶν - περὶ τοῦ Γρυνείου Ἀπόλλωνος - Λεόντιον - Ἀρτοπώλιδες - Δημόται - Θεοί - Στρατιῶται - Φορμοφόροι - paeanum auctor in Antigonum et Demetrium - περὶ Ἀριστοτέλους - περὶ Γοργίου - περὶ τῶν ἑπτὰ σοφῶν

- περὶ Ἱππώνακτος - περὶ Ἰσοκράτους - περὶ τῶν Ἰσοκράτους μαθητῶν - περὶ νομοθετῶν - γλῶσσαι Κρητικαί - Κρητικαὶ γλῶσσαι - Συνώνυμα - Κωμῳδουμένων - Σύμμικτα ὑπομνήματα - πρὸς τὸν Φιλοσωκράτην - Ἡρόδωρος ἐν ἑπτακαιδεκάτῃ τοῦ καθ᾽ Ἡρακλέα λόγου - *ex eodem opere ducta* - περὶ σύκων - Συνεργαζόμεναι - Ὧροι Κολοφωνίων - Ἀσπίς - Ἔργα - Ἠοῖαι - αἱ εἰς Ἡσίοδον ἀναφερόμεναι μεγάλαι Ἠοῖαι - *Ἠοίην Hermesianax finxit puellae nomen fuisse Ascraicae, cuius amore captus fuisset Hesiodus* - Κήϋκος γάμος - Μελαμποδία - *Αἰγίμιος carmen ab aliis Cercopi Milesio tributum* - Ἀστρονομία - περὶ ὕλης - *scripsit de rebus Alexandri Magni* - περὶ τῆς Καρχηδονίων πολιτείας - Αἰγυπτιακὴ Ἰλιάς - Θαΐς - περὶ τῆς πατρίδος (*i.e.* περὶ τῶν Ἐρυθρῶν) ἱστορίαι - ἐν τῷ ἐπιγραφομένῳ Συναγωγή - περὶ διαίτης· ὃ τινὲς ἐπιγράφουσι περὶ ὀξέων νοσημάτων οἱ δὲ περὶ πτισάνης, ἄλλοι δὲ πρὸς τὰς Κνιδίας γνώμας - περὶ πτισάνης, ὃ ἐκ τοῦ ἡμίσους μὲν νοθεύεται, ὑπ᾽ ἐνίων δὲ καὶ ὅλον - περὶ τόπων - περὶ ὑδάτων - *ex eiusdem Aphorismis aut ex Epidemiorum libro secundo* - Ἐπιστολὴ πρὸς Λυγκέα - Ἑξάμετροι τόνοι - Ἀνάνιος ἢ Ἱππῶναξ ἐν Ἰάμβοις - Ἐπικιχλίδες - Ἰλιάδ. - Ὀδυσσεία - Ὀδ. - Ὕμνος εἰς Ἀπόλλωνα - κατὰ Ἀρισταγόρας (*quae ipsius fuerat concubina* XIII.590c, d) - κατὰ Ἀρισταγόρας δεύτερος - Δηλιακός - κατὰ Δημάδου - κατὰ Δημοσθένους - κατὰ Μαντιθέου αἰκίας - κατὰ Πατροκλέους - κατὰ Φιλιππίδου - ὑπὲρ Φρύνης - Κυμαϊκά - περὶ τῶν Ἀλεξάνδρου ἱερῶν - περὶ πλακούντων - Μέλη - *quorum unum* Ἄθλοι, *Ibyco a nonnullis tribuitur, sed Stesichoro vindicatur ab Athenaeo* - Εὐρυτίδαι - Καινεύς - Λαέρτης - Φοῖνιξ ἢ Καινεύς - ἐν Φοίνικι - ἐν τῷ δευτέρῳ Φοίνικι - Φρουροί - Ἐπιδημίαι - περὶ Χίου - τῆς Παρθίας περιηγητικός - Ἀρεοπαγιτικός - περὶ τοῦ ζεύγους - Ἀττικά - περὶ Πτολεμαΐδος τῆς ἐν Αἰγύπτῳ - πρὸς Τίμαιον ἀντιγραφαί - Ἐπίγραμμα *in Leonteum tragoedum* - Θεατρικὴ ἱστορία - τὰ περὶ Λιβύης συγγράμματα - Ὁμοιότητες - Ὕμνος εἰς τὴν ἐν Ἑρμιόνῃ Δήμητρα ἄσιγμος - Ὠιδὴ ἄσιγμος, ἡ ἐπιγραφομένη Κένταυρος - Ἁλιευτικός - Φράτορες - Διθύραμβοι - περὶ Πυθαγόρου - Μενέδημος σάτυροι - κατὰ Δημάδου - κατὰ Λεωκράτους - κατὰ Λυκόφρονος πρῶτος - Αἰγυπτικά - Ἀποφθέγματα - Ἐπιστολαὶ δειπνητικαί - πρὸς Ἀπολλόδωρον - πρὸς Διαγόραν - πρὸς Ἱππόλοχον - πρὸς τὸν κωμικὸν Ποσείδιππον - Κένταυρος *comoedia* - περὶ Μενάνδρου - Τέχνη ὀψωνητική - περὶ ἰαμβοποιῶν - *orationes* - περὶ νόστων - περὶ τῆς Ἀττάλου παιδείας - Κωακά - *epigramma sepulcrale Alexandrinum fecit* - Ἐπιστολή - Χρεῖαι - Παράγγελμα - Διόνυσος πρῶτος - Διόνυσος δεύτερος - Λυδοί - Σιφνίων Ὧροι - Μακεδονικῶν - *parodia inscripta* Δεῖπνον - Μαρσύας - περὶ τῶν ἐν Ἐλευσῖνι μυστηρίων - καὶ φακῆς σύγκρισις - Σικυωνικά - περὶ τεχνιτῶν - Ἁλιεῖς - Ἀνδρόγυνος ἢ Κρής - Ἀνεψιοί - Ἀρρηφόρος ἢ Αὐλητρίς - Δημιουργός - Δύσκολος - Ἑαυτὸν τιμωρούμενος - Ἐγχειρίδιον - Ἐμπιμπραμένη - Ἐπίκληρος πρώτη - Ἐπιτρέποντες - Ἐφέσιος - Θεοφορουμένη - Θρασυλέων - Καρίνη - Καρχηδόνιος - Κεκρύφαλος - Κόλαξ - Κρής - Μέθη - Μηναγύρτης - Μισογύνης - Ναύκληρος - Νομοθέτης - Ὀργή - Παιδίον - Παλλακή - Παρακαταθήκη - Περινθία - Πωλούμενοι - Ῥαπιζομένη - Ὑμνίς - Φάνιον - Φάσμα - Χαλκεῖα - Ψευδηρακλῆς - Συναγωγή - Πολιτικά - περὶ ἀναθημάτων - Ἀρκεσίλαος - τῶν κατὰ Σάμον ἐνδόξων ἀναγραφή - περὶ τῶν κατὰ τὸ ἱερὸν τῆς Σαμίας Ἥρας - Αὖραι ἢ Μαμμάκυθος - Αὖραι - κατὰ τὰς Μεταγένους Αὔρας ἢ τὸν Ἀρισταγόρου Μαμμάκυθον - Θουριοπέρσαι - *drama* ἀδίδακτον - Φιλοθύτης - Τρωικά - περὶ ἀλειπτικῆς - Ναννώ - Ὀψαρτυτικός - Ὀψοποιία Σικελική - Παίγνια - περὶ Ἀσίας - Εὐρωπιακά - Μνασέας ἐν τρίτῳ Εὐρώπης - Περίπλους - Ἱπποτρόφος - Φίλιππος - περὶ ἔδεστῶν - περὶ

κωθωνισμοῦ ἐπιστολή - Φοινικικά - Μνημοσύνη poema epicum - περὶ Ἱέρωνος νεώς - Ἐξήγησις Ῥοδιακῶν λέξεων - Μηχανικῶν - Μεσσηνιακά - Ἱστορικὰ παράδοξα - Ναύκληροι - Περσίς - Αἱ περὶ Ἄτταλον Ἱστορίαι - Ἑλληνικά - τῶν Ἑλληνικῶν ἱστοριῶν - περὶ τελετῆς - περὶ τελετῶν - Ὧροι Κυζικηνῶν - Γλωσσῶν - Διονυσιάς - περὶ ἐπιγραμμάτων - Θεατρικὰ ὑπομνήματα - Γυναικῶν κατάλογος - Ἐπιγράμματα - Προυσίου συμπτώματα - Περιπέτειαι - Αἰτωλῶν Γεωργικά - Ἑτεροιούμενα - Εὐρωπία - Θηριακά - ἐν Θηριακῷ - Κολοφωνιακῶν - Οἰταϊκῶν - Ἀττικὰ ὀνόματα - Μετονομασίαι - Ἀρκαδικά - Διαδοχαί - τῶν φιλοσόφων διαδοχαί - περὶ τῶν φιλοσόφων ἱστορία - Νικοβούλη ἢ ὁ ἀναθεὶς ταύτῃ τὰ συγγράμματα - Ἡρακλῆς χορηγός - Ἱστοριαι (centum quadraginta quattuor libris comprehensae) - Εἰλείθυια - περὶ ἑορτῶν Αἰγυπτίων - περὶ Ὀρφέως - Πανδώρα - Χειρογάστορες - Ἄβρα - Ἀντερῶσα - Ἄντυλλος. Νικόστρατος ἢ Φιλέταιρος ἐν Ἀντύλλῳ - Ἀπελαυνόμενος - Βασιλεῖς - Διάβολος - Ἱεροφάντης - Ἡσίοδος - Κλίνη - Μάγειρος - Πατριῶται - Σύρος - Τοκιστής - Ψευδοστιγματίας - Ἀσίας περίπλους - περὶ Ἡρακλείας - τῆς Ἀσίας περίπλους - Περίπλοι - περὶ τῶν ἐν Σικελίᾳ θαυμαζομένων - Ἰάλεμος - Κάλλαισχρος - περὶ γλωσσῶν καὶ ὀνομάτων - περὶ ὀνομάτων καὶ γλωσσῶν - carmen in honorem Adriani et Antinoi - Θαλάσσια ἔργα - Κογχορείς - πρὸς Ἀλέξανδρον ἐπιστολαί - Κυνικῶν Συμπόσιον - Μαγειρικὴ διδασκαλία - περὶ διαλέκτου - περὶ τῶν παρὰ τοῖς ἱστορικοῖς λέξεων ζητουμένων - Λακωνικὴ πολιτεία - Συμποτικοὶ διάλογοι - συμποτικὰ ὑπομνήματα - unus ex iis qui scripsere πλακουντοποιικὰ συγγράμματα - Πρυτάνεων Ἑρεσίων - περὶ τῶν ἐν Σικελίᾳ τυράννων - πρὸς τοὺς σοφιστάς - Τυράννων ἀναίρεσις ἐκ τιμωρίας - περὶ Εὐδόξου - Ἀγαθοί - Ἄγριοι - Αὐτόμολοι - Γρᾶες - Γραφεῖς - Δουλοδιδάσκαλος - Ἐπιλήσμων - Ἐπιλήσμων ἢ Θάλαττα - Ἱπνὸς ἢ Παννυχίς - Κοριαννώ - Κραπάτακι - Λῆροι - Μεταλλεῖς - ὁ πεποιηκὼς τοὺς εἰς αὐτὸν (τὸν Φερεκράτην) ἀναφερομένους Μεταλλεῖς - Μυρμηκάνθρωποι - Φερεκράτης ἢ ὁ πεποιηκὼς τοὺς Πέρσας - Πετάλη - Τυραννίς - Χείρων. ὁ τὸν Χείρωνα πεποιηκώς, εἴτε Φερεκράτης ἐστὶν εἴτε Νικόμαχος ὁ ῥυθμικός - Χείρων ὁ εἰς τὸν Φερεκράτην ἀναφερόμενος - Φερεκράτης ἢ ὁ πεποιηκὼς τὸν Χείρωνα - περὶ ἀφροδισίων σύγγραμμα - Ἀττικαὶ φωναί - Ἀττικὰ ὀνόματα ἢ γλῶσσαι - ἐν τοῖς περὶ Ἀττικῶν ὀνομάτων ἢ γλωσσῶν - ἐν τῷ περὶ Ἀττικῶν ὀνομάτων - Παντοδαπῶν χρηστηρίων βιβλίον - Ἄγροικος - Ἀνανεουμένη - Ἁρπαζόμενός - Βαβυλώνιος - Ζωμίον - Ἰατρός - Κορινθία - Μετίων ἢ Ζωμίον - Μετίων - Μοιχός - Νέαιρα - Παρεισιῶν - Πτωχή - Πτωχὴ ἢ ῥοδιά - Ῥόδεα - Σικελικός - Χήρα - Ἄντυλλος. Νικόστρατος ἢ Φιλέταιρος ἐν Ἀντύλλῳ - Ἀσκληπιός - Ἀταλάντη - Κορινθιαστής - Κυνηγίς - Λαμπαδηφόροι - Οἰνοπίων - Φίλαυλος - Ἄτακτα - Κροκωνιδῶν διαδικασία - Ἀνανέωσις - Αὐλοί - Νάννιον Philippidi nonnulii tribuunt - Συμπλέουσαι - Τριόδων ἢ Ῥωοπώλης - Ἀνδροτίων ἢ Φίλιππος ἢ Ἡγήμων ἐν τῷ Γεωργικῷ - περὶ Καρῶν καὶ Λελέγων - κατὰ Σοφοκλέους λόγος - Μεταλλικός - περὶ μαντικῆς - Τετράπολις - Θετταλικῶν, εἰ γνήσια τὰ συγγράμματα - περὶ τῶν ἐν Ῥόδῳ Σμινθίων - Κόθορνοι - περὶ τῶν ἐν τῇ Ἀσίᾳ πόλεων - Δήλιος - περὶ τῶν παραδόξων ποταμῶν - περὶ τροφῆς - Γαλάτεια - Ὑμέναιος - Πόλεις. Φιλύλλιος ἐν Πόλεσι - Φιλύλλιος ἢ ὅστις ἐστὶν ὁ ποιήσας τὰς Πόλεις - Ἀριστοφάνης ἢ Φιλύλλιος ἐν ταῖς Πόλεσι - Φρεώρυχος - Μισουμένη - Φίλαρχος - Ἀπελεύθεροι - Ἐφιάλτης - Κρόνος - Ποάστριαι - Τραγῳδοί - Παιάν - tres hexametri - Olympia - Pythia - fragmenta - Γρῦπες - Ἑορταί - Ζεὺς κακούμενος - αἱ ἀφ ἱερῶν - Κλεοφῶν - Λάϊος - Λάκωνες - Μενέλαος - Νὺξ μακρά - Πείσανδρος - Περιαλγής - Πρέσβεις

- Σκευαί. Ἀριστοφάνης ἢ Πλάτων ἐν ταῖς Σκευαῖς, ὡς Χαμαιλέων φησί - Σοφισταί - Συμμαχία. Πλάτων ἢ Κάνθαρος ἐν Συμμαχίᾳ - Σύρφαξ - Ὑπέρβολος - Φάων - βιβλίον Πλάτωνος ἐμβρόντητον Ophelion - Ἀλκιβιάδης πρότερος - Ἀλκιβιάδης δεύτερος - Ἀλκυὼν dialogus non Platonis, sed Leontis Academici est - περὶ ἀνδρείας (i.e. Λάχης) - Ἀπολογία - Ἀτλαντικός (i.e. Κριτίας) - Γοργίας - Ἐπίγραμμα εἰς Ἀρχαιάνασσαν ἑταίραν - Εὐθύδημος - Θεαίτητος - Ἱππίας - Κρατύλος - Κριτίας - Κρίτων - Λάχης - Μενέξενος - Μένων - Παρμενίδης - Πρωταγόρας - τὸ Πλάτωνος συσσίτιον - Τίμαιος - Φαίδων - Φίληβος - Χαρμίδης - περὶ ψυχῆς Φαίδων - περὶ τῆς Ἀθήνησιν ἀκροπόλεως - ἐν τοῖς περὶ ἀκροπόλεως - πρὸς Ἀδαῖον καὶ Ἀντίγονον - Πολέμων ἐν τοῖς πρὸς Ἀντίγονον περὶ ζωγράφων - πρὸς Ἀράνθιον ἐπιστολή - περὶ Ἄρτου - πρὸς Ἄτταλον ἐπιστολή - περὶ τοῦ Δίου κωδίου - Ἑλλαδικός. Πολέμων ἢ ὅστις ἐστὶν ὁ ποιήσας τὸν ἐπιγραφόμενον Ἑλλαδικόν - περὶ τῶν κατὰ πόλεις ἐπιγραμμάτων - περὶ θαυμασίων - περὶ τῶν ἐν Καρχηδόνι πέπλων - περὶ τῶν ἐν Λακεδαίμονι ἀναθημάτων - περὶ περὶ Μορύχου - πρὸς Νεάνθην ἀντιγραφαί - περὶ ὀνομάτων ἀδόξων ἐπιστολή - περὶ παρασίτων - περὶ τῆς ποικίλης στοᾶς τῆς ἐν Σικυῶνι - περὶ Σαμοθράκης - περὶ τῶν ἐν Σικελίᾳ ποταμῶν - περὶ τῶν ἐν Σικυῶνι πινάκων - περὶ τοῦ παρὰ Ξενοφῶντος κανάθρου - περὶ Ἀφροδίτης - Λακωνικά - περὶ ἀφροδισίων - Μουσῶν γοναί - Ῥοδιακά - Ἀναβλέπων - Ἀποκλειομένη - Ἐφεσία - Λοκρίδες - Μεταφερόμενος - Χορεύουσαι - Αἰθιοπία - Ἀσωπία - Ἀμαζονίς - Μαγνητικά - Δύμαιναι ἢ Καρυάτιδες - Ὑπόρχημα - Ἡμίαμβοι - Ἀκροάσεις ἐρωτικαί - περὶ Δαφνικῶν ἀγώνων - περὶ τῶν ἐπὶ Δάφνῃ πανηγύρεων - Κωμικαὶ (?) ἱστορίαι - Λακωνικῆς Πολιτείας - Ὑπομνήματα (viginti quattuor libris comprehensa) - περὶ τὸν Φιλοπάτορα ἱστορίαι - περὶ ὀρχήσεως - Κρητικῶν νομίμων - περὶ Αἰγίνης - περὶ τῆς ἐρυθρᾶς θαλάσσης - Ἀγήν - τὴν Ῥωμαϊκὴν ἱστορίαν τῇ Ἑλλήνων φωνῇ ἐκδέδωκε - Ἰλίου Πέρσις - Γέλως - Φιλίππου βίος - Μελέαγρος - Ἱστορίη - περὶ Ἑλληνισμοῦ - Ἱλαρὰ ἄσματα - Δηλιάς - Νησιάς - περὶ παιάνων - Γοργώ - ἰάμβων - eius carmen epinicium in Leophronem, Olympiae victorem - Ὀψαρτυσία - ἐν τοῖς ποιήμασι - περὶ Ὅρων καὶ τόπων καὶ πυρὸς καὶ λίθων - Ἐπικλήσεις (θεῶν) - ἐμφυλίου πολέμου - Βακχίς - Βακχίδος μνηστῆρες - Βακχίδος γάμος - Γαλάται - Εὐβουλοθεόμβροτος - Μύσται - Μυστακοῦ θητίον - Νέκυια - Πύλαι - Σίλφαι - Φακῆ - Φυσιολόγος - Ἀνδροκλῆς - Σοφοκλῆς Ἐπὶ ταιναρίοις - Αἴας - Αἰγεύς - Αἰθίοπες - Ἄμυκος - Ἄμυκος σατυρικός - Ἀμφιάραος σατυρικός - Ἀντηνορίδαι - Ἀντιγόνη - tacito fabulae titulo Ἀχαιῶν σύνδειπνον - Ἀχιλλέως ἐρασταί - Ἑλένης γάμος - Ἐπίγονοι - Ἔρις - Ἠλέκτρα - Θαμύρας - Θάμυρις - Ἴναχος - Ἰφιγένεια - Ἰχνευταί - Καμίκιοι - Κηδαλίων - Κολχίδες - Κρίσις - Λαρισσαῖοι - Ναυσικάα - Νιόβη - Οἰδίπους τύραννος - Οἰνόμαος - Ποιμένες - Σαλμωνεύς - Σκύθαι Σύνδειπνοι - Σύνδειπνον - Τραχινίαι - Τριπτόλεμος - Τυμπανισταί - Τυρώ - Ὕβρις - Φαίακες - Μῖμοι - Μῖμοι ἀνδρεῖοι - ὁ Ἀγροιώτης - ὁ θυννοθήρας - Παιδικά - Ὠλιεὺς τὸν ἀγροιώταν - Σώφρων ἐν τῷ Ἀγροιώτῃ - Μῖμοι γυναικεῖοι - Γυναῖκες αἳ τὰν θεὸν φαντὶ ἐνδεῖξαι - Νυμφοπόνος - Πενθερά - περὶ Ἀλκμᾶνος - περὶ θυσιῶν τῶν ἐν Λακεδαίμονι - Σωσίβιος ἐν τοῖς περὶ θυσιῶν - Ὁμοιότητες - περὶ χρόνων - περὶ βασιλείας πρὸς Κάσανδρον - Ἠοῖοι - Φιλοσόφων διαδοχή - Σωσικράτης ἐν ταῖς Διαδοχαῖς - Δάφνις ἢ Λιτυέρσας - Ἐγκλειόμεναι - Παραλυτρούμενος - περὶ τῶν Τίμωνος σίλλων - Ὅμοια - Τέχνη ἐρωτική - Γηρυονίς - Καλύκη - Ὀρεστεία - Συοθῆραι - περὶ Θεμιστοκλέους, Θουκυδίδου καὶ Περικλέους - Γεωγραφικῶν - Γεωγραφουμένων - Φοινικίδης - Ἀγαθοί. Φερεκράτης ἢ Στράττις ἐν Ἀγαθοῖς

- Ἀνθρωπορραίστης - Καλλιππίδης - Κινησίας - Λημνομέδα - Μακεδόνες - Μακεδόνες ἢ Κινη-
σίας - Μακεδόνες ἢ Παυσανίας - Παυσανίας - Ποτάμιοι - Τρῶιλος - Χρύσιππος - Ψυχασταί
- Κωμῳδίαι σατυρικαί - Ἀμφικτύονες - Ἡσίοδοι - Πρυτάνεις - Στερροί - Τελχινιακὴ ἱστορία -
περὶ τοῦ ἄστεως - Ἀργώ - Ὑμέναιος διθύραμβος - Γαστρολογία - Ὁρισμοί - Ἄισματα - Παλ-
ληνίς - Χρυσῆ βίβλος - Ἰθύφαλλοι - Βερενίκη - Φαρμακεύτριαι - griphus de umbra - griphus de
Theseo - Τέχνη - εἰς Ἔρωτα μέλος - Κένταυροι διθύραμβος - auctor cantilenae quae Oscillorum
feriis canebatur - Ἀττικαὶ γλῶσσαι - περὶ ἀγώνων - Φάσμα ἢ Φιλάργυρος - Φιλοδέσποτος -
Ἐλεγεῖαι - Βακχικὰ ἔπη - Βοιωτία - Νεοπτόλεμος - Παγκρατιαστής - Προιτίδες - Φίλαυλος -
Αἴτια φυτικά - περὶ γελοίου - περὶ τῶν δακέτων καὶ βλητικῶν - περὶ ἐνθουσιασμοῦ - Ἐρωτικός
- περὶ ἑτεροφωνίας τῶν ὁμογενῶν - περὶ εὐδαιμονίας - περὶ κολακείας - περὶ τῶν μεταβαλλόν
τῶν τὰς χρόας - περὶ τῶν ἐν τῷ ξηρῷ διαιτωμένω - περὶ ὀδμῶν - περὶ πνιγμοῦ - περὶ τῶν κατὰ
τόπου διαφορῶν - Ὑπομνήματα. Ἀριστοτέλης ἢ Θεόφραστος ἐν τοῖς ὑπομνήμασιν - περὶ φυ-
τῶν ἱστορία vel φυτικὴ ἱστορία aut τὰ περὶ φυτῶν aut φυτικά - Ἄδμητος - Ἀλθαία - Ἀφροδίτη
- Ἡδυχάρης - Μῆδος - Νεμέα - Πηνελόπη - Στρατιώτιδες - Φιλιππικά - πρὸς Ἀλέξανδρον συμ-
βουλαί - ἡ πρὸς Ἀλέξανδρον ἐπιστολή - Θεόπομπος ἐν τοῖς περὶ τῆς χίας ἐπιστολῆς - περὶ
τῶν ἐκ Δελφῶν συληθέντων χρημάτων - κατὰ τῆς Πλάτωνος διατριβῆς - Ἀρμάτιον - κατὰ
Ἐπικούρου βιβλία - Προοίμια - Ἐπίγραμμα εἰς Εὐριπίδην - Δεῖπνον vel Δεῖπνα - Δείπνων - ἐν
τοῖς Δείπνοις - τοῦ Δείπνου - Δείπνου - περὶ τοῦ Ἐρατοσθένους Ἑρμοῦ - Αἰγύπτιοι - Δεξαμενός
- Δῆλος - Δημοσάτυροι - Διονυσιάζουσαι - Δρακόντιον - Ἐπιστολαί - Ἐπιχαιρέκακος - Ἰκάριοι
- Ἰκάριοι σάτυροι - Καύνιοι - Κένταυρος ἢ Δεξαμενός - Κονίσαλος - Λήθη - Μαραθώνιοι -
Ὀρεσταυτοκλείδης - Πορφύρα - Πύκτης - Σαπφώ - Φιλοδικαστής - Ψευδοληισταί - περὶ τῆς
σφαιριστικῆς - Κυπριακά - Σίλλοι - Περίδειπνον (Ἀρχεσιλάου) - Κυνάριον - Ναυτίλος - Νόμοι
(μουσικοί) - Ὠδίν (Σεμέλης) - περὶ Ἀττικῆς προσῳδίας - περὶ ὀνομασιῶν - Τρύφων ἐν τοῖς
Ὀνομαστικοῖς - Πένταθλος - Πορφύρα - Πρίαπος - Σκύθαι - Συμποιτικοὶ νόμοι - Ἀγησίλαος -
Ἀλκιβιάδης δεύτερος Platonis, ab nonnullis Xenophonti tributus - Ἀνάβασις Κύρου - περὶ τοῦ
παρὰ Ξενοφῶντι ἐν τοῖς Ἀπομνημονεύμασιν Ἀντιφῶντος librum edidit Hephaestion - Ἱέρων ἢ
Τυραννικός - περὶ ἱππικῆς - Κυνηγετικός - Οἰκονομικός - Παιδεία - περὶ πόρω - Ζηνὶς ἢ Ζηνεὺς
ὁ Χῖος ἐν τῷ περτῆς Χίον συγγράμματι - περὶ πολιτείας - Ἐπιτομαί - Ἱστορικὰ ὑπομνήματα,
quorum auctor Callimachus aut Zenodotus - Ὁμήρου ἔκδοσις - Ζηνοφάνης ἐν τῷ Συγγενιχῷ -
Ὀφαρτυτικά.

An interesting aspect of the work done by August Meineke is the effort to preserve
the original Greek forms used by Athenaeus in the *Deipnosophists* to refer to titles
and descriptions of works and to their internal divisions.[73] The forms listed in the
previous pages are those printed in the Teubner edition of Meineke. Sometimes
they appear in an abbreviated form because references to book numbers and other
internal divisions have been separated and stored in the database field Sub Work.[74]

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73 This aspect is also present in the indices of Georg Kaibel (sections 5.5.2 and 5.5.3), but not
 anymore in those published by Douglas S. Olson (section 5.5.4).
74 An example is the expression ἐν τῷ πρώτῳ τῶν τῆς Ἀσίας Σταθμῶν that is part of the index
 entry of Amyntas (p. 456) from Ath., *Deipn.* 500d (= 11.102). The expression has been split
 into τῶν τῆς Ἀσίας Σταθμῶν (Work) and ἐν τῷ πρώτῳ (Sub Work).

Future work of the *Digital Athenaeus* project plans two different tasks: 1) align these forms with the Greek text of the *Deipnosophists* in order to automatically annotate them in the context[75] and 2) lemmatize these forms and create entries for a complete text-based catalog of the works cited by Athenaeus.

Finally, the following 117 unique expressions are used by Meineke to characterize authors in his index:[76]

Academicus (3) - *actor scenicus* (1) - *Aegypti vectigalibus ab Alexandro praefectus* (1) - *Agesarchi filius* (1) - *Aristophaneus* (2) - *Aristotelis discipulus* (6) - *arithmeticus* (1) - *Attica apis* (1) - *auctor scolii* (1) - *Caesaris imperatoris legatus* (1) - *Callimacheus* (1) - *Callimachi discipulus* (1) - *Callimachus* (1) - *citatur* (2) - *colabrorum poeta* (1) - *comici* (1) - *comicus* (99) - *comicus (?)* (1) - *comicus an tragicus* (1) - *criticus* (1) - *cyclicae Thebaidis auctor* (1) - *cynicus* (3) - *delectatus est cyclo epico et totas fabulas inde desumsit* (1) - *dialecticus* (1) - *Dieuchis medici discipulus* (1) - *dithyramborum poeta* (1) - *duo nominantur Dionysii* (1) - *elegiacus* (1) - *Epicureus* (1) - *epicus* (3) - *epicus poeta* (1) - *Euergetes* (1) - *glossographus* (1) - *Gorgiae discipulus* (1) - *grammatica* (1) - *grammaticus* (14) - *grammaticus Aristophaneus* (1) - *Harmonicus* (1) - *Herculis sacerdos* (1) - *Hermodori filius* (1) - *historicus* (2) - *iambographus* (1) - *iamborum poetria* (1) - *Iambus* (1) - *Isocratis discipulus* (2) - *iunior* (3) - *ludicrarum et amatoriarum cantilenarum auctor* (1) - *lyricus* (1) - *lyricus (Stesichorus?)* (1) - *lyricus poeta* (1) - *magnus* (1) - *mater Alexandri* (1) - *mechanicus* (1) - *medicus* (20) - *medicus Erasistrateus* (1) - *Menodori Erasistratei amicus* (1) - *Mnesiptolemi filius* (1) - *multa a Xantho lyrico accepta corrupit* (1) - *musicus videtur* (1) - *novae Academiae philosophus* (1) - *orator* (15) - *parasitus* (1) - *parodicus poeta* (1) - *parodus* (4) - *Periegeta* (2) - *peripateticus* (1) - *philosophus* (1) - *poeta* (3) - *poeta aut poetria* (1) - *poeta dithyrambicus* (1) - *poeta elegiacus* (1) - *poeta hilarodus* (1) - *poeta liyricus* (1) - *poeta philosophus* (1) - *poetria* (1) - *poetria lyrica* (1) - *pseudaristophaneus* (1) - *Pythagoricus* (3) - *rhetor* (2) - *satyricum drama cuius nomen periit* (1) - *Scytobrachion* (1) - *sillographus* (1) - *Socraticus* (2) - *sophista* (1) - *Sophronisci filium aiunt nonnulli auctorem fuisse dialogorum, quos pro suis edidit Aeschines* (1) - *Sotadis Maronitae filius* (1) - *stoicus* (5) - *Syracusarum tyrannus* (1) - *Theophrasti discipulus, frater Duridis historici, amicus Hippolochi* (1) - *tibicen* (1) - *tragicus* (15) - *ὁ ἀστρολογικός* (1) - *ὁ θαυμασιώτατος* (1) - *ὁ θειότατος* (1) - *ὁ ἰαμβοποιός* (1) - *ὁ ἱερώτατος* (1) - *ὁ Καλλαίσχρου* (1) - *ὁ λεπτός* (1) - *ὁ λυτικός* cognominatus (1) - *ὁ μελοποιός* (1) - *ὁ μουσικός* (1) - *ὁ νεώτερος* (2) - *ὁ νησιώτης* (1) - *ὁ περιηγητής* (1) - *ὁ ῥυθμικός* (1) - *ὁ σοφιστής* (1) - *ὁ τοῦ Ἀρείου* (1) - *ὁ τοῦ Ἀριστονίκου* (1) - *ὁ τοῦ Διονυσίου* (1) - *ὁ τοῦ Τρύφωνος* (1) - *ὁ τραγικός* (1) - *ὁ τῶν ποιητῶν βασιλεύς* (1) - *ὁ τύραννος* (1) - *ὁ χαλκοῦς* (1) - *ποιητής* (1) - *σοφὸς πεμματολόγος* (1) - *συγγραφεύς* (1).

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75 See section 5.5.6.

76 This data has been extracted from the database field `Characterization` of the digital version of the *Index Scriptorum* of Meineke and is arranged in alphabetical order by language. Numbers in round brackets refer to the total number of unique occurrences in the field `Characterization` with a distinction by `Name` and `Ethnicon`.

5.5.2 Kaibel – Index Scriptorum

This index is part of the third volume of the Teubner edition of the *Deipnosophists* published by Georg Kaibel in 1890 (*Index Scriptorum*).[77] The index includes a list of authors and works cited by Athenaeus and, like for the *Index Scriptorum* of Meineke, the digital version of it has been created starting from the OCR output of the printed volume.[78] Also in this case, the OCR output has been parsed using bash scripts and manually corrected in order to create an SQL database organized in fields containing data collected and arranged by Kaibel for each author and work. Like in the *Index Scriptorum* of Meineke, the OCR output embeds each index entry in a TEI XML element `<p>`.[79] The structure of the *Index Scriptorum* of Kaibel has more data than the *Index Scriptorum* of Meineke, as it is shown in the example concerning the entry of Demetrius of Scepsis (p. 604) in table 5.1.[80] Athenaeus' book numbers have been extracted and collected in a separate field, Roman numerals have been converted into Arabic numerals, and Casaubon citations have been converted into Kaibel citations using the *Casaubon-Kaibel Reference Converter.*[81]

Greek and Latin expressions used by Kaibel in his *index* have been preserved and entries have been structured to separate data in the following search fields that are accessible through the *Index Digger* (fig. 5.13):[82]

- `Name`: author name (e.g., AESCHYLVS) and other index entries (e.g., ΤΕΛ-ΧΙΝΙΑΚΗ ΙΣΤΟΡΙΑ);
- `Ethnicon 1`: place of origin of an author (e.g., Samius);
- `Ethnicon 2`: second place of origin of an author, when applicable (e.g., Babylonius);

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77   Kaibel (1887–1890), vol. III 565–676.

78   The digital version of the *Index Scriptorum* is available at http://www.digitalathenaeus .org/tools/KaibelIndexScriptorum/. The digitization of the edition of Kaibel has been performed as part of the *Open Greek and Latin* project: see section 5.3.

79   The XML file is available at https://github.com/OpenGreekAndLatin/athenaeus-dev/blob/ master/athenaeusKaibel_3.xml.

80   The page of the printed edition can be visualized at https://archive.org/details/athe naeinavcrati03atheuoft/page/604/mode/1up. In the table there are three fields called `Ethnicon` because there are cases where Kaibel prints more than one *ethnicon*, as in the examples of Agathocles (Cyzicenus, Babylonius) and of Polemo (ὁ εἴτε Σάμιος ἢ Σικυώνιος εἴτ' Ἀθηναῖος ὀνομαζόμενος). The field `Passage` has been added because Kaibel prints the reference passages of cited works, including fragment numbers. Finally, the field `Asterisk` includes the asterisk (*) that sometimes is printed by Kaibel to signal dubious works and passages. On these fields, see below.

81   See section 5.4.1. On the complexities represented by the correspondences between Casaubon sections and Kaibel paragraphs and on reference ranges, see section 5.5.1.

82   http://www.digitalathenaeus.org/tools/KaibelIndexScriptorum/digger.php

Table 5.1. Kaibel, *Index Scriptorum*: data structure (Demetrius of Scepsis)

Name	Ethnicon1	Ethnicon2	Ethnicon3	Characterization	Note	Work	SubWork	Note(Work)	Passage	Asterisk	Note(Reference)
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ α΄		fr. 1		IV.141e
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ α΄		fr. 1		IV.141f
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν δευτέρῳ		fr. 3		XIV.658b
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ὀγδόῳ		fr. 6		VIII.346b
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ὀγδόῳ		fr. 6		VIII.346c
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ ι΄		fr. 6		XV.697c
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ ι΄		fr. 6		XV.697d
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν διωδεκάτῳ		fr. 8		XIV.644a
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ ιε΄		fr. 7		IV.155a
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ ιε΄		fr. 7		IV.155b
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ ιε΄		fr. 9		III.80d
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ἑκκαιδεκάτῳ		fr. 10		IV.173f
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ἑκκαιδεκάτῃ		fr. 11		VII.300d
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ ιθ΄		fr. 13		XV.697d
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ κδ΄		fr. 14		IV.174a
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ἕκτῳ καὶ εἰκοστῷ		fr. 15		III.91c
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ἕκτῳ καὶ εἰκοστῷ		fr. 16		X.425c
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου		libro non indicato	fr. 72		II.44e
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου		libro non indicato	fr. 73		IV.167d
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου		libro non indicato	fr. 74		VI.236d
DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου		libro non indicato	fr. 74		VI.236e

- `Ethnicon 3`: third place of origin of an author, when applicable (e.g., εἴτ' Ἀθηναῖος ὀνομαζόμενος);
- `Characterization`: literary genre or profession of an author (e.g., comicus);
- `Note`: Kaibel notes to name, ethnicon and/or characterization fields (e.g., Ἀλεξῖνος coni);
- `Work`: work titles (e.g., Πέρσαι);
- `Sub Work`: sub works (e.g., ἐν τῇ πρὸς Φιλόξενον Ἐπιστολῇ) or book numbers (e.g., ἐν τῇ λ´ Ἱστοριῶν);
- `Note (Work)`: Kaibel notes to work titles (e.g., titulus suspectus);
- `Passage`: work passages cited in the *Deipnosophists* (e.g., fr. 33);
- `Athenaeus Book`: book numbers of the *Deipnosophists* for each occurrence (e.g., Book 5);
- `Casaubon Reference`: references to passages in the *Deipnosophists* where authors and works are cited (e.g., 9.388c);
- `Kaibel Reference`: conversion of Casaubon references into Kaibel references (e.g., 9.40);
- `Asterisk`: asterisks used by Kaibel to signal dubious works and passages (*);
- `Note (Reference)`: Kaibel notes to Casaubon references (e.g., cf. adn. ad litt. d).

Additional outputs fields are the same of the *Index Scriptorum* of Meineke and the following are examples of combined search results for the *Index Scriptorum* of Kaibel: `Name` (HOMERVS) AND `Work` (Ἰλιάδος); `Characterization` (comicus) AND `Athenaeus Book` (Book 5); `Work` (Προμηθεὺς Δεσμώτης) OR `Work` (Προμηθεὺς Λυόμενος).

Also the *Index Scriptorum* of Kaibel has a *Dynamic Graph* where results can be obtained by filtering data using the following filter fields:[83]

- `Name`: author name (e.g., AESCHYLVS) and other index entries (e.g., ΤΕΛ-ΧΙΝΙΑΚΗ ΙΣΤΟΡΙΑ);
- `Ethnicon 1`: place of origin of an author (e.g., Samius);
- `Ethnicon 2`: second place of origin of an author, when applicable (e.g., Babylonius);
- `Ethnicon 3`: third place of origin of an author, when applicable (e.g., εἴτ' Ἀθηναῖος ὀνομαζόμενος);
- `Characterization`: literary genre or profession of an author (e.g., comicus);
- `Work`: work titles (e.g., Πέρσαι);
- `Sub Work`: sub works (e.g., ἐν τῇ πρὸς Φιλόξενον Ἐπιστολῇ) or book numbers (e.g., ἐν τῇ λ´ Ἱστοριῶν);
- `Passage`: work passages cited in the *Deipnosophists* (e.g., 268).

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83 http://digitalathenaeus.org/tools/KaibelIndexScriptorum/dynamic_graph.php

Digital Athenaeus
G. Kaibel: Athenaei Naucratitae Dipnosophistarum libri 15 - Index Scriptorum

Insert one or more entry... | OR | Submit

Where Name='DEMETRIVS' AND Ethnicon_1='ὁ Σκήψιος'

#	Name	Ethnicon 1	Ethnicon 2	Ethnicon 3	Characterization	Note	Work	Sub Work	Note (Work)	Passage	Athenaeus Book	Casaubon Reference	Kaibel reference	Vote	Asterisk	Note (Reference)	Read Greek Text (Perseus)	Read Greek Text (FrontEnd UniLeipzig)	Annotate with Perseids
3167	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ α´		fr. 1	4	4.141e	4.19				4.19	4.19	4.19
3168	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ α´		fr. 1	4	4.141f	4.19 4.20	Vote			4.19 4.20	4.19 - 4.20	4.19 - 4.20
3169	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν δευτέρῳ		fr. 3	14	14.658b	14.76				14.76	14.76	14.76
3170	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ὀγδόῳ		fr. 6	8	8.346b	8.36				8.36	8.36	8.36
3171	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ὀγδόῳ		fr. 6	8	8.346c	8.36 8.37	Vote			8.36 8.37	8.36 - 8.37	8.36 - 8.37
3172	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ ι´		fr. 6	15	15.697c	15.53				15.53	15.53	15.53
3173	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ ι´		fr. 6	15	15.697d	15.53				15.53	15.53	15.53
3174	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν δωδεκάτῳ		fr. 8	14	14.644u	14.51				14.51	14.51	14.51
3175	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ α´		fr. 7	4	4.155a	4.41 4.42	Vote			4.41 4.42	4.41 - 4.42	4.41 - 4.42
3176	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ α´		fr. 7	4	4.155b	4.42				4.42	4.42	4.42
3177	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ α´		fr. 9	3	3.80d	3.19				3.19	3.19	3.19
3178	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν δωκαδεκάτῳ		fr. 10	4	4.173f	4.74				4.74	4.74	4.74
3179	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν δωκαδεκάτῳ		fr. 11	7	7.300d	7.56 7.57	Vote			7.56 7.57	7.56 - 7.57	7.56 - 7.57
3180	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ δ´		fr. 13	15	15.697d	15.53				15.53	15.53	15.53
3181	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν τῷ κθ´		fr. 14	4	4.174a	4.74 4.75	Vote			4.74 4.75	4.74 - 4.75	4.74 - 4.75
3182	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ὀκτῳ καὶ εἰκοστῷ		fr. 15	3	3.91c	3.41				3.41	3.41	3.41
3183	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου	ἐν ὀκτῳ καὶ εἰκοστῷ		fr. 16	10	10.425c	10.25				10.25	10.25	10.25
3184	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου		libro non indicato	fr. 72	2	2.44e	2.22				2.22	2.22	2.22
3185	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου		libro non indicato	fr. 73	4	4.167d	4.63 4.64	Vote			4.63 4.64	4.63 - 4.64	4.63 - 4.64
3186	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου		libro non indicato	fr. 74	6	6.296d	6.29				6.29	6.29	6.29
3187	DEMETRIVS	ὁ Σκήψιος					Τρωικοῦ διακόσμου		libro non indicato	fr. 74	6	6.296e	6.29 6.30	Vote			6.29 6.30	6.29 - 6.30	6.29 - 6.30

Figure 5.13. Kaibel, *Index Scriptorum*: Demetrius of Scepsis

NAME citations in Athenaeus where CHARACTERIZATION is like TRAGICUS

AGATHO
THEODECTES
ASTYDAMAS
CARCINVS
ARISTIAS
PHRYNICHVS
NOTHIPPVS
DIOGENES
SOSITHEVS
ANTIPHO
PHILOCLES

Citations

Athenaeus Book

Highcharts.com
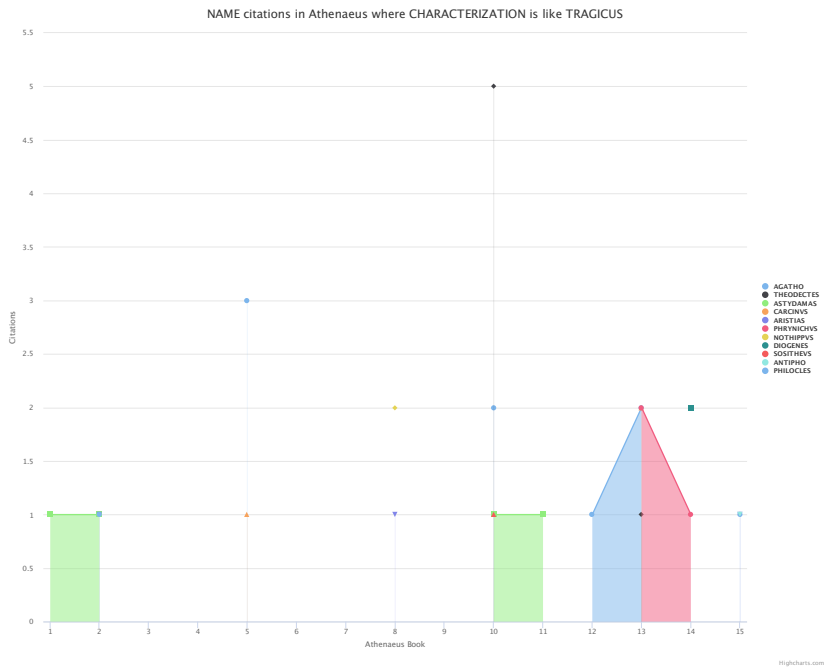
Figure 5.14. *Dynamic Graph* (Kaibel, *Index Scriptorum*): *tragicus*

The following are examples of filtered search results with their corresponding links to the *Dynamic Graph* of the *Index Scriptorum* of Kaibel: `Work + Name` (HOMERVS); `Name + Characterization` (tragicus) (fig. 5.14). Also in this case results of the *Dynamic Graph* are visualized through *Highcharts*, can be printed, and can be downloaded as a PNG image, JPEG image, PDF document and SVG vector image. It is also possible to hide/show graphs by selecting/deselecting entries in the list at the right of the chart, and visualize the number of occurrences in each book of the *Deipnosophists* by hovering the mouse over the selected book.[84]

The *Digital Athenaeus* project provides scholars with a *Web API* with a JSON output of *Index Digger* queries of the *Index Scriptorum* of Kaibel:[85]

`api.php?what=<search string>&where=<search field>&exact=[yes:no]`

Search fields of the Web API can be one of the following: `name, ethnicon_1, ethnicon_2, ethnicon_3, characterization, note, work, sub_work, note_work, passage, book, casaubon_reference, kaibel_reference, note_reference`. For example, if we want to visualize citations of Istros the Callimachean as they are collected and arranged by Kaibel in his index, we get the following result:[86]

```
[
    {
        "Name": "ISTER",
        "Ethnicon_1": "",
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        "Characterization": "ὁ Καλλιμάχειος (6.272b, 11.478b)",
        "Note": "",
        "Work": "ἐν ταῖς πρὸς Τιμαῖον Ἀντιγραφαῖς",
        "Sub_Work": "",
        "Note_Work": "",
        "Passage": "om. FHG",
        "Book": "6",
        "Casaubon_Reference": "6.272b",
        "Kaibel_Reference": "6.103",
        "Asterisk": "",
        "Note_Reference": "",
        "Is_Range": ""
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    {
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        "Ethnicon_1": "",
        "Ethnicon_2": "",
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84   Cf. fig. 5.12 for the *Index Scriptorum* of Meineke.
85   http://digitalathenaeus.org/tools/KaibelIndexScriptorum/api.php
86   http://digitalathenaeus.org/tools/KaibelIndexScriptorum/api.php?what=ISTER&where=Name&exact=yes

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            "Ethnicon_3": "",
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            "Note_Work": "",
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            "Kaibel_Reference": "13.4",
            "Asterisk": "",
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            "Note": "",
            "Work": "ἐν τοῖς Ἀττικοῖς",
            "Sub_Work": "",
            "Note_Work": "",
            "Passage": "fr. 36",
            "Book": "3",
            "Casaubon_Reference": "3.74e",
            "Kaibel_Reference": "3.6",
            "Asterisk": "",
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            "Is_Range": ""
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        },
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            "Note": "",
            "Work": "Πτολεμαΐδος τῆς ἐν Αἰγύπτῳ πόλεως",
            "Sub_Work": "ἐν πρώτῳ",
            "Note_Work": "",
            "Passage": "fr. 38",
            "Book": "11",
            "Casaubon_Reference": "11.478b",
            "Kaibel_Reference": "11.55 and/or 11.56",
            "Asterisk": "",
            "Note_Reference": "",
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            "Note": "",
            "Work": "libri incerti",
            "Sub_Work": "",
            "Note_Work": "",
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            "Kaibel_Reference": "8.35",
            "Asterisk": "",
            "Note_Reference": "",
            "Is_Range": ""
        }
    ]
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The *Index Scriptorum* of Kaibel includes the following 751 unique expressions to refer to author names and their *ethnica* cited by Athenaeus in the *Deipnosophists*:[87]

ACESIAS - ACHAEVS Eretriensis - ADAEVS Mitylenaeus - ADRASTVS - AEGIMIVS - AELIVS ASCLEPIADES - AESCHINES ὁ Κοθωκίδης - AESCHINES - AESCHRIO ὁ Σάμιος - AESCHYLIDES - AESCHYLVS - AESCHYLVS Alexandrinus - AESOPVS - AETHLIVS Samius

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87 This data represents the language of Kaibel, has been extracted from the fields `Name`, `Ethnicon1`, `Ethnicon2`, and `Ethnicon3` of the database, and is arranged as in the *Index Scriptorum* of Kaibel.

- AGALLIS Corcyraea - AGATHARCHIDES Cnidius - AGATHOCLES Atracius - AGATHO-
CLES Cyzicenus Babylonius - AGATHO - AGELOCHVS - AGIAS Argivus - AGIAS - AGIS -
AGLAOSTHENES Naxius - ALCAEVS Mitylenaeus - ALCAEVS - ALCETAS - ALCIDAMAS ὁ
Ἐλαΐτης - ALCIMVS ὁ Σικελιώτης - ALCIPHRO Magnes - ALCIPHRO ὁ Μαιάνδριος - ὁ τὴν
ἈΛΚΜΑΙΩΝΙΔΑ ποιήσας - ALCMAN - ALEXAMENVS ὁ Τήιος - ALEXANDER MAGNVS -
ALEXANDER ὁ Αἰτωλός - ALEXANDER - ALEXANDER ὁ Μύνδιος - ALEXARCHVS - ALEXAS
- ALEXINVS - ALEXIS - ALEXIS ὁ Σάμιος - †ΑΛΕΞΙΣΩΝ - AMARANTVS ὁ Ἀλεξανδρεύς -
AMERIAS ὁ Μακεδών - AMIPSIAS - AMMONIVS - AMPHICRATES - AMPHILOCHVS - AM-
PHIO ὁ Θεσπιεύς - AMPHIS - AMYNTAS - ANACREO Teius - ANANIVS - ANAXAGORAS -
ANAXANDRIDES - ANAXILAS - ANAXIMANDER - ANAXIMENES ὁ Λαμψακηνός - ANAX-
IPPVS - ANDOCIDES - ANDREAS ὁ Πανορμίτης - ANDREAS - ANDRISCVS Naxius - ANDRO
- ANDRO ὁ Ἀλεξανδρεύς - ANDROCYDES - ANDROSTHENES - ANDROTIO - ANICETVS -
ANTHEAS ὁ Λίνδιος - ANTHIPPVS - ANTICLIDES ὁ Ἀθηναῖος - ANTIDOTVS - ANTIGONVS
ὁ Καρύστιος - ANTIMACHVS ὁ Κολοφώνιος - ANTIOCHVS - ANTIOCHVS ὁ Ἀλεξανδρεύς -
ANTIPATER ὁ Ταρσεύς - ANTIPHANES - ANTIPHO - ANTISTHENES - APIO ὁ Ἀλεξανδρεύς
- APOLLAS - APOLLODORVS ὁ Ἀθηναῖος - APOLLODORVS Artamitenus - APOLLODORVS
- APOLLODORI ὁ Γελῷος - APOLLODORI ὁ Καρύστεος - APOLLODORI incertum Geloi an
Carystii - APOLLODORVS ὁ Κυρηναῖος - APOLLONIVS - APOLLONIVS ὁ Ῥόδιος ὁ Ναυκρα-
τίτης - APOLLOPHANES - ARAROS - ARATVS - ARCHEDICVS - ARCHELAVS ὁ Χερρονη-
σίτης - ARCHEMACHVS - ARCHESTRATVS ὁ Συρακόσιος ἢ Γελῷος - ARCHESTRATVS -
ARCHILOCHVS - οἱ μετ' Ἀρχίλοχον ποιηταί - ARCHIMELVS - ARCHIPPVS - ARCHYTAS -
ARCTINVS - ARGAS - οἱ τὰ ΑΡΓΟΛΙΚΑ γράψαντες - ARIPHRO ὁ Σικυώνιος - ARISTAGO-
RAS - ARISTARCHVS - ARISTEAS - ARISTIAS ὁ Φλ(ε)ιάσιος - ARISTIDES - ARISTIPPVS -
ARISTO ὁ Κεῖος - ARISTOBVLVS ὁ Κασσανδρεύς - ARISTOCLES - ARISTOCRATES - ARIS-
TODEMVS - ARISTOGITO - ARISTOMENES - ARISTOMENES ὁ Ἀθηναῖος - ARISTONICVS -
ARISTONYMVS - ARISTOPHANES - ARISTOPHANES ὁ Βυζάντιος - ARISTOPHANES Boeo-
tus - ARISTOPHO - ARISTOTELES ὁ Σταγιρίτης - ARISTOXENVS - ARISTVS ὁ Σαλαμίνιος
- ARMENIDES - ARTEMIDORVS ὁ Ἐφέσιος - ARTEMIDORVS - ARTEMO ὁ Κασανδρεύς -
ASCLEPIADES ὁ Μυρλεανός - ASCLEPIADES Tragilensis - ASCLEPIADES - ASIVS ὁ Σάμιος
- ASOPODORVS ὁ Φλ(ε)ιάσιος - ASPASIA - ASTYDAMAS - ATHANIS - ATHENAEVS Nau-
cratita - ATHENIO - ATHENOCLES ὁ Κυζικηνός - ATHENODORVS - ΑΤΡΕΙΔΩΝ ΚΑΘΟΔΟΣ -
AVTOCRATES - AXIONICVS - AXIOPISTVS ὁ Λοκρὸς ὁ Σικυώνιος - BAETO - BACCHYLIDES
- BASILIS - BATO ὁ Σινωπεύς - BATO - BEROSVS - BIO ὁ Βορυσθενίτης - BIO Solenais - BIO
- BITO - BLAESVS - BOEOTVS - BOEVS - BOTHRYS Messanius - CAECALVS Argivus - CAE-
CILIVS - CALLIADES - CALLIAS - CALLIAS ὁ Ἀθηναῖος - CALLIAS ὁ Μιτυληναῖος - CALLIAS
Syracusanus - CALLICRATES - CALLIMACHVS Cyrenaeus - CALLINVS Ephesius - CALLIP-
PVS - CALLISTHENES - CALLISTRATA ἡ Λεσβία - CALLISTRATVS - CALLIXINVS ὁ Ῥόδιος -
CANTHARVS - CAPITO ὁ Ἀλεξανδρεύς - CARCINVS - CARYSTIVS ὁ Περγαμηνός - CASTORIO
ὁ Σολεύς - CAVCALVS ὁ Χῖος - CEPHALIO - CEPHALVS - CEPHISODORVS - CEPHISODORVS
ὁ Θηβαῖος - CERCIDAS ὁ Μεγαλοπολίτης - CERCOPS ὁ Μιλήσιος - CHAEREAS - CHAER-

EMO - CHAEREPHO - CHAMAELEO ὁ Ποντικός ὁ Ἡρακλεώτης - CHARES ὁ Μιτυληναῖος - CHARICLES - CHARICLIDES - CHARO ὁ Λαμψακηνός - CHIONIDES - CHOERILVS Samius - CHOERILVS Iasensis - CHORONICVS - CHRYSIPPVS ὁ Σολεύς - CHRYSIPPVS ὁ Τυανεύς - CHRYSOGONVS - CINESIAS - CLEANTHES - CLEARCHVS ὁ Σολεύς - CLEARCHVS - CLEOBVLINA ἡ Λινδία - CLEOMENES ὁ Ῥηγῖνος - CLEOMENES - CLEOSTRATVS ὁ Τενέδιος - CLIDEMVS - CLITARCHVS - CLITOMACHVS ὁ Καρχηδόνιος - CLYTVS ὁ Μιλήσιος - CORINNA - COTTA - CRATES - CRATES ὁ Θηβαῖος - CRATINVS - CREOPHYLVS - CRITIAS - CRITO - CROBYLVS - CTESIAS ὁ Κνίδιος - CTESIBIVS - CTESICLES - CYPRIAS ὁ Ἁλικαρνασσεύς - τὰ ΚΥΠΡΙΑ ΕΠΗ ὁ ποιήσας - DAIMACHVS - DAMO - DAMOXENVS - DEMADES - DEMARETE - DEMETRIVS ὁ Βυζάντιος - DEMETRIVS ὁ Ἰξίων - DEMETRIVS ὁ Μάγνης - DEMETRIVS ὁ Σκήψιος - DEMETRIVS ὁ Τροιζήνιος - DEMETRIVS ὁ Φαληρεύς - DEMETRIVS - DEMO - DEMOCHARES - DEMOCLIDES - DEMOCRITVS ὁ Ἐφέσιος - DEMODAMAS ὁ Ἁλικαρνασσεὺς ἢ Μιλήσιος - DEMONICVS - DEMOPHILVS - DEMOSTHENES ὁ Παιανιεύς - DERCYLVS - DEXICRATES - DICAEARCHVS ὁ Μεσσήνιος - DICAEOCLES ὁ Κνίδιος - DIDYMVS - DIEVCHES - DIEVCHIDAS - DINO - DINOLOCHVS - DIO - DIOCLES ὁ Καρύστιος - DIOCLES - DIOCLIDES ὁ Ἀβδηρίτης - DIODORVS - DIODORVS ὁ Σινωπεύς - DIODORVS ὁ Σικελιώτης - DIODOTVS Erythraeus - DIOGENES ὁ Βαβυλώνιος - DIOGENES - DIONYSIVS ὁ Θρᾷξ - DIONYSIVS - DIONYSIVS ὁ Ἰτυκαῖος - DIONYSIVS ὁ Λεπτός - DIONYSIVS ὁ Λευκτρικός - DIONYSIVS ὁ Σάμιος - DIONYSIVS ὁ Σινωπεύς - DIONYSIVS ὁ Χαλκοῦς - DIONYSODOTVS ὁ Λάκων - DIOSCORIDES - DIOTIMVS - DIOTIMVS ὁ Ὀλυμπιηνός - DIOXIPPVS - DIPHILVS - DIPHILVS ὁ Λαοδικεύς - DIPHILVS ὁ Σίφνιος - DIYLLVS ὁ Ἀθηναῖος - DORIEVS - DORIO - DOROTHEVS - DOROTHEVS ὁ Ἀσκαλωνίτης ὁ Σιδώνιος - DOSIADAS - DRACO ὁ Κερκυραῖος - DROMO - DVRIS ὁ Σάμιος - ECHEMENES - ECPHANTIDES - EMPEDOCLES - EMPEDVS - EPAENETVS - EPARCHIDES - EPHIPPVS ὁ Ὀλύνθιος - EPHIPPVS - EPHORVS - EPICHARMVS ὁ Συρακόσιος - EPICRATES ὁ Ἀμβρακιώτης - EPICVRVS - EPIGENES - EPIGRAMMATA - EPILYCVS - EPIMENIDES ὁ Κρής - EPINICVS - ERASISTRATVS ὁ Ἰουλιήτης - ERATOSTHENES ὁ Κυρηναῖος - ΕΡΓΕΙΑΣ ὁ Ῥόδιος - ERINNA - ERIPHANIS - ERIPHVS - ERXIAS - EVALCES - EVANGELVS - EVANTHES - EVBOEVS ὁ Πάριος - EVBVLVS - EVBVLIDES - EVCRATES - EVDOXVS ὁ Κνίδιος - EVENOR - EVENVS ὁ Πάριος - EVHEMERVS - EVMACHVS ὁ Κορκυραῖος - EVMACHVS ὁ Νεαπολίτης - EVMEDES - EVMELVS ὁ Κορίνθιος - EVMENES ὁ Καρδιανός - EVMOLPVS - EVNICVS - ΕΥΠΑΤΡΙΔΩΝ - EVPHANTVS - EVPHORIO ὁ Χαλκιδεύς - EVPHRANOR - EVPHRO - EVPHRONIVS - EVPOLIS - EVRIPIDES - EVRYPYLVS - EVTHIAS - EVTHYCLES - EVTHYDEMVS - EVXITHEVS - GALENE ἢ Σμυρναία - GALENVS Pergamenus - GLAVCIAS - GLAVCIDES - GLAVCO - GLAVCVS ὁ Λοκρός - GNATHAENA - GORGIAS ὁ Ἀθηναῖος - GORGO - HAGNOCLES ὁ Ῥόδιος - HAGNO - HANNONIS - HARMODIVS ὁ Λεπρεάτης - HARPOCRATIO ὁ Μενδήσιος - HECATAEVS ὁ Μιλήσιος - HEDYLE - HEDYLVS ὁ Σάμιος ἢ Ἀθηναῖος - HEGEMO ὁ Θάσιος - HEGEMO - HEGESANDER ὁ Δελφός - HEGESIANAX ὁ Ἀλεξανδρεύς - HEGESIAS - HEGESIPPVS - HEGESIPPVS ὁ Ταραντῖνος - HELIODORVS ὁ Ἀθηναῖος - HELLANICVS - HENIOCHVS - HEPHAESTIO - HERACLEO ὁ Ἐφέσιος - HERACLIDES ὁ Κυμαῖος - HERACLIDES ὁ Λέμβος - HERACLIDES ὁ Μοψεάτης - HERACLIDES ὁ Ποντικός -

HERACLIDAE δύο Συρακόσιοι - HERACLIDES ὁ Ταραντῖνος - HERACLIDES - HERACLITVS - HERMESIANAX ὁ Κολοφώνιος - HERMIAS ὁ Κουριεύς - HERMIAS ὁ Μηθυμναῖος - HERMIAS Σάμιος - HERMIAS fortasse Samius - HERMIPPVS - HERMIPPVS ὁ Σμυρναῖος - HERMIPPVS ὁ Κυζικηνός - HERMOCLES - HERMONAX - HERODES ATTICVS - HERODIANVS - HERODICVS ὁ Βαβυλώνιος - HERODORVS ὁ Ἡρακλεώτης - HERODOTVS ὁ Ἁλικαρνασσεύς - HERODOTVS ὁ Λύκιος - HERONDAS - HEROPYTHVS - HESIODVS - HICESIVS - HIERONYMVS Cardianus - HIERONYMVS ὁ Ῥόδιος - HIPPAGORAS - HIPPARCHVS - HIPPASVS - HIPPIAS ὁ Ἐρυθραῖος - HIPPIAS - HIPPO - HIPPOCRATES - HIPPOLOCHVS ὁ Μακεδών - HIPPONAX - HIPPYS ὁ Ῥηγῖνος - HOMERVS - HYBRIAS ὁ Κρής - HYPERIDES - HYPEROCHVS - IASO - IATROCLES - IBYCVS ὁ Ῥηγῖνος - IDOMENEVS - IO ὁ Χῖος - ISIDORVS ὁ Χαρακηνός - ISOCRATES - ISTER - IVBA - LAMPROCLES - LAMYNTHIVS ὁ Μιλήσιος - LASVS ὁ Ἑρμιονεύς - LEO - LEO ὁ Βυζάντιος - LEONIDAS ὁ Βυζάντιος - LESCHES - LEVCO - LICYMNIVS ὁ Χίος - LOCRICA - LYCEAS ὁ Ναυκρατίτης - LYCO ὁ Ἰασεύς - LYCOPHRO ὁ Χαλκιδεύς - LYCOPHRONIDES - LYCVRGVS - LYCVS - LYNCEVS ὁ Σάμιος - LYSANIAS ὁ Κυρηναῖος - LYSIAS - LYSIMACHVS - LYSIPPVS - MACAREVS - MACHO ὁ Σικυώνιος ἢ Κορίνθιος - MAEANDRIVS - MAGNES - MALACVS - MARSYAS Pellaeus? - MARSYAS Philippensis? - MATREAS - MATRIS fort. Thebanus - MATRO ὁ Πιταναῖος - MEGACLES - MEGACLIDES - MEGASTHENES - MELANIPPIDES ὁ Μήλιος - MELANTHIVS - MELEAGER ὁ Γαδαρεύς - MENAECHMVS ὁ Σικυώνιος - MENANDER - MENECLES ὁ Βαρκαῖος - MENESTHENES - MENETOR - MENIPPVS - MENODORVS - MENODOTVS ὁ Σάμιος - METAGENES - METROBIVS - METRODORVS ὁ Σκήψιος - METRODORVS ὁ Χῖος - METRODORVS - MIMNERMVS - MITHAECVS Siculus - MNASALCAS ὁ Σικυώνιος - MNASEAS ὁ Λοκρὸς ἢ Κολοφώνιος - MNASEAS ὁ Πατρεύς - MNESIMACHVS - MNESIPTOLEMVS - MNESITHEVS ὁ Ἀθηναῖος - MOCHVS - MOERO ἡ Βυζαντία - MOLPIS ὁ Λάκων - MOSCHINA ἡ Ἀττική - MOSCHIO - MOSCHVS - MYRO ὁ Πριηνεύς - MYRSILVS - NAVSICRATES - NEANTHES ὁ Κυζικηνός - NEOCLES ὁ Κροτωνιάτης - NEOPTOLEMVS ὁ Παριανός - NESIOTES - NESTOR - NICAENETVS ὁ Σάμιος ἢ Ἀβδηρίτης - NICANDER ὁ Θυατειρηνός - NICANDER ὁ Καλχηδόνιος - NICANDER ὁ Κολοφώνιος - NICANOR ὁ Κυρηναῖος - NICIAS ὁ Νικαεύς - NICIAS - NICO - NICO ἡ Σαμία - NICOBVLE - NICOCHARES - NICOCLES ὁ Λάκων - NICOLAVS ὁ Δαμασκηνός - NICOMACHVS - NICOMEDES ὁ Ἀκάνθιος - NICOMEDES - NICOPHO - NICOSTRATVS - NOTHIPPVS - NVMENIVS ὁ Ἡρακλεώτης - NYMPHIS ὁ Ἡρακλεώτης - NYMPHODORVS ὁ Συρακόσιος - OLYMPIAS - OPHELIO - OPPIANVS ὁ Κίλιξ - οἱ ΟΨΑΡΤΥΤΙΚΛ συνθέντες - ORACVLA DELPHICA - PAMPHILVS ὁ Σικελός - PAMPHILVS ὁ Ἀλεξανδρεύς - PANAETIVS ὁ Ῥόδιος - PANCRATES Aegyptius - PANCRATES ὁ Ἄρκας - PANYAS(S)IS - PARMENIO - PARMENISCVS - PARMENO ὁ Βυζάντιος - PARMENO ὁ Ῥόδιος - PARMEN(I)O - PARRHASIVS - PARTHENIVS - PAXAMVS - PERIANDER ὁ Κορίνθιος - PERSAEVS ὁ Κιτιεύς - PHAEDIMVS - PHAENIAS ὁ Ἐρέσιος - ΦΑΙΤΟΣ - PHALAECVS - PHANOCRITVS - PHANODEMVS - PHERECRATES - PHERECYDES - PHERENICVS ὁ Ἡρακλεώτης - PHILAENIS ἡ Λευκαδία - PHILEMO - PHILEMO ὁ Ἀθηναῖος - PHILETAERVS - PHILETAS ὁ Κῷος - PHILINVS - PHILIPPIDES - PHILIPPVS - PHILIPPVS ὁ Θεαγγελεύς - PHILISCVS - PHILISTIO ὁ Λοκρός - PHILLIS ὁ Δήλιος - PHILO - PHILO Nicomedensis? - PHILOCHORVS -

PHILOCLES - PHILOCRATES - PHILOMNESTVS - PHILONIDES - PHILOSTEPHANVS ὁ Κυρηναῖος - PHILOTIMVS - PHILOXENVS - PHILOXENVS ὁ Κυθήριος - PHILOXENVS ὁ Λευκάδιος - PHILYLLIVS - PHOCYLIDES - PHOENICIDES - PHOENIX ὁ Κολοφώνιος - PHORMVS - PHRYNICHVS - PHRYNIS - PHYLARCHVS ὁ Ἀθηναῖος ἢ Ναυκρατίτης - PHYLARCHVS - PHYLOTIMVS - PINDARVS - PISANDER - PLATO - PLISTONICVS - PLVTARCHVS - POLEMARCHVS - POLEMO ὁ εἴτε Σάμιος ἢ Σικυώνιος εἴτ' Ἀθηναῖος ὀνομαζόμενος - POLIOCHVS - POLYBIVS ὁ Μεγαλοπολίτης - POLYCHARMVS ὁ Ναυκρατίτης - POLYCHARMVS - POLYCLETVS ὁ Λαρισαῖος - POLYCRATES - POLYDEVCES ὁ Παριανός - POLYZELVS - POSIDIPPVS - POSIDONIVS ὁ Ἀπαμεύς ὕστερον δὲ Ῥόδιος χρηματίσας - POSIDONIVS ὁ Κορίνθιος - POSSIS ὁ Μάγνης - PRATINAS ὁ Φλ(ε)ιάσιος - PRAXAGORAS ὁ Κῷος - PRAXILLA ἡ Σικυωνία - PRAXITELES - PROMATHIDAS ὁ Ἡρακλεώτης - PROTAGORIDES ὁ Κυζικηνός - PROVERBIA - PROXENVS - PTOLEMAEVS ὁ Μεγαλοπολίτης - PTOLEMAEVS - PYLADES - PYRES ὁ Μιλήσιος - PYRGIO - PYRRHANDER - PYTHAENETVS - PYTHAGORAE - PYTHAGORAS - PYTHEAS - PYTHEAS ὁ Φιγαλεύς - PYTHERMVS ὁ Ἐφέσιος - PYTHERMVS ὁ Τήιος - PYTHO ὁ Καταναῖος ἢ Βυζάντιος - PYTHONICVS ὁ Ἀθηναῖος - QVINTILII fratres - RHIANVS - RHINTO - RVTILIVS - SALPE ἡ Λεσβία - SANCHVNIATHON - SANNYRIO - SAPPHO - SATYRVS - SCAMO - SCIRAS ὁ Ταραντῖνος - SCOLIA ADESPOTA[88] - SCYLAX - SCYTHINVS ὁ Τήιος - SELEVCVS - SELEVCVS ὁ Ταρσεύς - SEMVS ὁ Δήλιος - ΣΙΚΥΩΝΙΑ (ΑΝΑΓΡΑΦΗ) - SILENVS - SILENVS ὁ Καλλατιανός - SIMARISTVS - SIM(M)IAS ὁ Ῥόδιος - SIMONIDES ὁ Ἀμόργιος - SIMONIDES ὁ Κεῖος - SIMVS ὁ Μάγνης - SIRO ὁ Σολεύς - SOCRATES - SOCRATES ὁ Ῥόδιος - SOLO - SOPATER ὁ Πάριος inde ὁ Φάκιος - SOPHILVS - SOPHOCLES - SOPHRO - SOSIBIVS ὁ Λάκων - SOSICRATES - SOSICRATES (Rhodius) - SOSICRATES ὁ Φαναγορείτης - SOSIPATER - SOSIPPVS - SOSITHEVS - SOSTRATVS - SOTADES - SOTADES Maronita - SOTIO ὁ Ἀλεξανδρεύς - SPEVSIPPVS - SPHAERVS - SPHODRIAS - STAPHYLVS Naucratita - STASINVS - STHENELVS - STEPHANVS - STESICHORVS - STESIMBROTVS ὁ Θάσιος - STILPO - STRABO - STRATO - STRATTIS - SVLLA - ΤΕΛΧΙΝΙΑΚΗ ΙΣΤΟΡΙΑ - TELECLIDES - TELENICVS ὁ Βυζάντιος - TELEPHANES - TELESILLA ἡ Ἀργεία - TELESTES ὁ Σελινούντιος - TENARVS - TERPSICLES - TERPSIO - TEVCER - THALETAS - ΘΗΒΑΙΣ - THEMISO - THEMISTAGORAS ὁ Ἐφέσιος - THEOCLES - THEOCRITVS ὁ Συρακόσιος - THEODECTES ὁ Φασηλίτης - THEODORIDAS ὁ Συρακόσιος - THEODORVS - THEODORVS ὁ Ἱεραπολίτης - THEOGNETVS - THEOGNIS ὁ Μεγαρεύς - THEOGNIS - THEOLYTVS ὁ Μηθυμναῖος - THEOPHILVS - THEOPHRASTVS ὁ Ἐρέσιος - THEOPOMPVS - THEOPOMPVS ὁ Χῖος - THEOPOMPVS ὁ Κολοφώνιος - THRASYMACHVS ὁ Χαλκηδόνιος - THVCYDIDES - TIMACHIDAS ὁ Ῥόδιος - TIMAEVS ὁ Ταυρομενίτης - TIMARCHVS - TIMO ὁ Φλ(ε)ιάσιος - TIMOCLES - TIMOCRATES ὁ Λάκων - TIMOMACHVS - TIMOTHEVS - TIMOTHEVS ὁ Μιλήσιος - TITANOMACHIA - TITVLI PVBLICI - TRYPHO ὁ Ἀλεξανδρεύς - VARRO - XANTHVS ὁ Λυδός - XANTHVS - XENARCHVS - XENOCRATES ὁ Χαλκηδόνιος - XENODEMVS - XENOPHANES ὁ Κολοφώνιος - XENOPHO - ZENIS ὁ Χῖος - ZENO ὁ Κιτιεύς - ZENODOTVS - ZENOPHANES - INCERTI.

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88   This form, like others in this list, is treated as a main entry in the *Index Scriptorum* of Kaibel.

The following 1,947 Greek and Latin unique expressions have been extracted from the *Index Scriptorum* of Kaibel as referring to work titles:[89]

Ὀψαρτυτικά - Ἆθλα - Αἴθων σατυρικός - Ἀλκμαίων σατυρικός - Ἥφαιστος - Ἶρις σατυρική - Κύκνος - Λίνος - Μοῖραι - Ὀμφάλη - fab. inc. - ἐν τοῖς περὶ Διαθέσεως - ἐν τῷ περὶ Ἀγαλματοποιῶν - πέντε βιβλία Περὶ τῶν παρὰ Θεοφράστῳ ἐν τοῖς περὶ Ἠθῶν, καθ᾽ ἱστορίαν καὶ λέξιν ζητουμένων, ἕκτον δὲ Περὶ τῶν ἐν τοῖς Ἠθικοῖς Νικομαχείοις Ἀριστοτέλους - Πλακουντοποιικὸν σύγγραμμα - ἐκ τῶν ἐπιγραφομένων Στεφάνων - ἐν τῷ κατὰ Τιμάρχου λόγῳ - Ctesiphont. - de dialogis eius - ἐν Ἀλκιβιάδη - ἐν τῷ Ἀξιόχῳ - ἐν τῇ Ἀσπασίᾳ - Καλλίας - ἐν τῷ Τηλαυγέι - ἐν τινι τῶν Ἰάμβων - Γεωργικῶν - Ἀγαμέμνων - Ἀθάμας - Ἀμυμώνη - Γλαῦκος Πόντιος - Δαναΐδες - Ἠδωνοί - Ἡλιάδες - Θεωροί - Ἰξίων - Κάβιροι - Κρῆσσαι - Λυκοῦργος - Μυρμιδόνες - Νεανίσκοι - Ὀστολόγοι - Παλαμήδης - Περραιβίδες - Πέρσαι - Προμηθεὺς Δεσμώτης - Προμηθεὺς Λυόμενος - Πρωτεὺς σατυρικός - Σφίγξ - Φιλοκτήτης - Φινεύς - Φορκίδες - Φρύγες - fab. incert. - Aeschyli epitaphium ab ipso scriptum - Ἀμφιτρύων - Μεσσηνιακὰ Ἔπη - interrogatio Apollinis Pythii - Σαμίων Ὥρων - libri incerti - Ἀσιατικά - Εὐρωπαϊκά - Ἁλιευτικά - περὶ Κυζίκου - Θυέστης - Τήλεφος - ἐν Ἀργολικοῖς - Ἰλίου Περσὶς - sedis incertae - Alcaei scolia - Ἀδελφαὶ Μοιχευόμεναι - Γανυμήδης - Ἱερὸς Γάμος - Καλλιστώ - Παλαίστρα - Παλαῖστραι - Περὶ τῶν ἐν Δελφοῖς ἀναθημάτων - Ἐγκώμιον Ναΐδος τῆς ἑταίρας - ἐν τοῖς Σικελικοῖς - ἐν τῇ ἐπιγραφομένη τῶν βίβλων Ἰταλικὴ - ᾄσματα - Alcmanis fortasse carmen - Διάλογοι - Ἀγήν σατυρικός - ἐν ταῖς Ἐπιστολαῖς ταῖς πρὸς τοὺς ἐν Ἀσίᾳ σατράπας - De epistulario Alexandri et familiarium - ἐν Ἁλιεῖ - ἐν Κρίκᾳ - Ἐλεγεῖον - Ἰωνικὰ ποιήματα - Πότος - Τιγόνιον - περὶ Ζῴων - περὶ Πτηνῶν Ζῴων - περὶ τῆς τῶν Πτηνῶν ἱστορίας - Πτηνῶν ἱστορίας - ad Casandrenses epistula - Παιὰν εἰς Κρατερὸν τὸν Μακεδόνα - ἐν τῷ περὶ Αὐταρκείας - Ὥρων Σαμιακῶν - Ἀγωνὶς ἢ Ἱππίσκος - ἐν Ἱππίσκῳ - Ἀδελφοί - Αἴσωπος - Ἀλείπτρια - Ἄντεια - Ἀπεγλαυκωμένος - Ἀποβάτης - Ἀποκοπτόμενος - Ἀποκοπτομένη - Ἀρχίλοχος - Ἀσκληπιοκλείδης - Ἀσωτοδιδάσκαλος - Ἀθίς - Βρεττία - Γαλάτεια - Γραφή - Γυναικοκρατία - Δακτύλιος - Δημήτριος ἢ Φιλέταιρος - ἐκ τοῦ διεσκευασμένου δράματος ὅ ἐπιγράφεται Δημήτριος - ἐν Δημητρίῳ - Δίδυμοι - Δὶς Πενθῶν - Δορκὶς ἢ Ποππύζουσα - ἐν Ῥοδίῳ ἢ Ποππυζούση - Δρωπίδης - Εἰσοικιζόμενος - Εἰς τὸ φρέαρ - Ἐκκηρυττόμενος - Ἐκπωματοποιός - Ἑλένη - Ἑλληνίς - Ἐπίδαυρος - Ἐπίκληρος - Ἐπίτροπος - Ἑπτὰ ἐπὶ Θήβαις - Ἐρετρικός - Ἔριθοι - Ἡσιόνη - Θεοφόρητος - Θεσπρωτοί - Θράσων - Ἱππεύς - ἐν Ἵππῳ - Ἱππίσκος - Ἰσοστάσιον - Καταψευδόμενος - Κλεοβουλίνη - Κνιδία - Κονιάτης - Κουρίς - Κράτεια ἢ Φαρμακοπώλης - ἐν Φαρμακοπώλη ἢ Κρατείᾳ - ἐν Κρατείᾳ - Κυβερνήτης - Κυβευταί - Κύπριος - Λαμπάς - Λέβης - ἐν Λεβητίῳ - Λευκαδία ἢ Δραπέται - ἐν Λευκαδίᾳ - Λεύκη - Λοκροί - Λυκίσκος - Μανδραγοριζομένη - Μίνως - Μάντεις - Μίδων - Μιλησία - ἐν Μιλησίοις - Μίλκων - Μνηστῆρες - Ὀδυσσεὺς Ὑφαίνων - Ὀλύνθιοι - ἐν Ὀλυνθίῳ - Ὁμοία - Ὀπώρα fabula - Ὀρέστης - Ὀρχηστρίς - Παγκρατιαστής - Παμφίλη - Παννυχὶς ἢ Ἔριθοι - ἐν Παννυχίδι - Ἐρίθοις - Παράσιτος - Ποιητής - ἐν Ποιηταῖς - Πολύκλεια - Πονήρα - Ποντικός - Πρωτόχορος - Πυθαγορίζουσα - Πυλαίαι - Πύραυνος - Σκίρων -

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89 This list is arranged according to the order in which these expressions appear in the *Index Scriptorum* of Kaibel, and data has been extracted from the databse field W̲o̲r̲k̲ of the digital version of the index.

Στρατιώτης - Συναποθνήσκοντες - Συντρέχοντες - Σύντροφοι - Σώρακοι - Ταραντῖνοι - Τίτθη - Τοκιστὴς ἢ Καταψευδόμενος - ἐν Καταψευδομένῳ - Τραυματίας - Τροφώνιος - Τυνδάρεως - Ὕπνος - Ὑποβολιμαῖος - Φαῖδρος - Φαίδων ἢ Φαιδρίας - Φιλίσκος - Φιλόκαλος ἢ Νύμφαι - Φιλοῦσα - Φρύξ - ἐν τῇ τοῦ Φρυγίου διασκευῇ - Φυγάς - Χορηγίς - Ψευδόμενος - ἐν τῷ περὶ Αὐλῶν - ἐν τοῖς περὶ Σκηνῆς - ἐν ταῖς Γλώσσαις - ἐν τῷ Ῥιζοτομικῷ - Ἀποκοτταβίζοντες - Κατεσθίων - Κόννος - Σφενδόνη - Περὶ βωμῶν καὶ θυσιῶν - Περὶ τῶν Ἀθήνησιν ἑταιρίδων - ἐν τῷ Περὶ ἐνδόξων ἀνδρῶν συγγράμματι - Περὶ τοῦ ἐν Ἑλικῶνι Μουσείου - Βαλανεῖον - Γυναικομανία - Διθύραμβος - Ἰάλεμος - Λευκάς - Ὀδυσσεύς - Οὐρανός - Πάν - Πλάνος - Φιλάδελφοι - Φιλέταιρος - τῶν τῆς Ἀσίας Σταθμῶν - Σταθμῶν - ἐν Σταθμοῖς Περσικοῖς - ἐν τοῖς Σταθμοῖς - τῶν Μελῶν - Anacreontis scolia - ἐν τοῖς Φυσικοῖς - Ἄγροικοι - Ἀγχίσης - Αἰσχρά - Ἀντέρως - Γεροντομανία - Ἡρακλῆς - Θησαυρός - Κέρκιος - Κυνηγέται - Νηρεύς - Νηρηίδες - Ὁπλομάχος - Πάνδαρος - Πόλεις - Πρωτεσίλαος - Σαμία - Σατυρίας - Τηρεύς - Ὕβρις - Φαρμακόμαντις - Φιαληφόρος - fab incert. - Διθύραμβον ἐδίδασκεν Ἀθήνησιν - Αὐλητής - Εὐανδρία - Καλυψώ - Κίρκη - Λυροποιός - Μάγειροι - Μονότροπος - Νεοττίς - Ὀρνιθόκομοι - Πλούσιοι - Ὑάκινθος Πορνοβοσκός - ἐν Ὑακίνθῳ - Χάριτες - Χρυσοχόος - ἐν τῇ Ἡρωολογίᾳ - ἐν ταῖς Πρώταις ἐπιγραφομέναις Ἱστορίαις - ἐν τῷ ἐπιγραφομένῳ Βασιλέων Μεταλλαγαί - incertae sedis - oratio in Phrynen - Ἐγκαλυπτόμενος - Κεραυνός - ἐν Κεραυνουμένῳ - Κιθαρῳδός - Φρέαρ - ἐν τῷ κατὰ Ἀλκιβιάδου - τῶν Σικελικῶν τῶν κατὰ πόλιν - ἐν τῷ περὶ Δακέτων - ἐν τῷ Περὶ τῶν ψευδῶς πεπιστευμένων - incerti libri - Naxiacorum - ἐν τοῖς Χρονικοῖς - ἐν τῷ τῆς Ἰνδικῆς Παράπλῳ - Atthidis - ἐν τῷ περὶ Γεωργικῶν - ἐν τῷ Γεωργικῷ - ἐν τῷ Ἐξηγητικῷ - Νόστοι - Μεμψίμοιρος - Βίοι - ἐν Ἀντιπάτρῳ - ἐν τῷ περὶ τοῦ Διονυσίου βίου τοῦ Ἡρακλεώτου τοῦ ἐπικληθέντος Μεταθεμένου - ἐν τῷ Ζήνωνος Βίῳ - ἐν τῷ περὶ τοῦ Ζήνωνος βίου - ἐν τῷ περὶ Ζήνωνος - ἐν τῷ Μενεδήμου Βίῳ - ἐν τῷ περὶ Λέξεως - ἐν τοῖς ἐπιγραφομένοις Δέλτοις - Θηβαΐς - Λυδή - Epistula ad Phaniam - ἐν τῷ Περὶ τῶν ἐν τῇ μέσῃ κωμῳδίᾳ κωμῳδουμένων ποιητῶν - περὶ Δεισιδαιμονίας - περὶ Ὀργῆς - Ἄγροικος - ἐν Ἀγροίκοις - ἐν Ἀγροικίσιν - Αἴολος - Ἀκέστρια - Ἀκοντιζομένη - Ἁλιευομένη - Ἄλκηστις - Ἀνταῖος - Ἀργυρίου Ἀφανισμός - Ἀρκάς - ἐν Ἀρκαδίᾳ - Ἁρπαζομένη - Ἀρχιστράτη - Ἄρχων - Ἀσκληπιός - Αὐλητρὶς ἢ Δίδυμαι - Αὐτοῦ Ἐρῶν - ἐν Ἑαυτοῦ Ἐρῶντι - Ἀφροδίσιον - Ἀφροδίτης Γοναί - Βάκχαι - Βοιώτιον - ἐν Βοιωτίᾳ - Βομβυλιός - Βούσειρις - Βουταλίων - Γάμος - ἐν Γάμοις - Γόργυθος - Δευκαλίων - Δηλία - Διπλάσιοι - Δραπεταγωγός - Δυσέρωτες - Δύσπρατος - Δωδώνη - Εὐθύδικος - Ζάκυνθος - Θαμύρας - Θορίκιοι ἢ Διορύττων - Ἰατρός - Ἱππῆς - Καινεύς - Κᾶρες - Καρίνη - Κηπουρός - Κιθαριστής - Κλεοφάνης - Κνοιθιδεὺς ἢ Γάστρων - ἐν Κνοιθιδεῖ - Κορινθία - Κύκλωψ - Κώρυκος - Λάμπων - Λεπτινίσκος - Λεωνίδης - Λήμνιαι - Λυδός - Λύκων - Μελανίων - Μέτοικος - Μητραγύρτης - Μισοπόνηρος - Μνήματα - Μοιχοί - Μύστις - Οἰνόμαος ἢ Πέλοψ - Ὅμοιοι - Ὁμοπάτριοι - Ὁμώνυμοι - Παιδεραστής - Παρεκδιδομένη - Παροιμίαι - Ποίησις - Προβατεύς - Πρόβλημα - Πρόγονοι - Σαπφώ - Σκληρίαι? - Σκύθης - Στρατιώτης ἢ Τύχων - ἐν Στρατιώτῃ - Τίμων - Τριταγωνιστής - Τυρρηνός - Ὑδρία - Φιλοθήβαιος - Φιλομήτωρ - Φιλοπάτωρ - Φιλῶτις - Φρεάρριος - Χρυσίς - ἐν τῷ περὶ Ἑταιρῶν - ἐν τῷ κατὰ Ἀλκιβιάδου λοιδορίας λόγος ἔχων ἐπίγραμμα περὶ Ταῶν - ἐν τῷ Πολιτικῷ - Γεωργικά - Ἀρχέλαος - Ἀσπασία - ἐν θατέρῳ τῶν Κύρων - Πολιτικὸς διάλογος - Protrepticus - Σάθων - Φυσιογνωμονικός - ἐν τῷ

Περὶ τῆς Ἀπικίου τρυφῆς - ἐν τῷ Περὶ τῆς Ῥωμαϊκῆς διαλέκτου - ἐν τῷ Περὶ τῶν ἐν Πελο-
ποννήσῳ πόλεων - ἐν τῇ πρὸς τὴν Ἀριστοκλέους Ἐπιστολὴν Ἀντιγραφῇ - Ἀττικαὶ Γλῶσσαι
- ἐν τῷ Περὶ τῶν Ἀθήνησιν ἑταιρίδων - τῶν Ἐτυμολογουμένων - Ἐτυμολογιῶν - ἐν τῷ περὶ
Ἐτυμολογιῶν - ἐν τοῖς περὶ Θεῶν - περὶ Νεῶν Καταλόγου - περὶ Σώφρονος τῷ εἰς τοὺς
Ἀνδρείους Μίμους - ἐν τοῖς περὶ Σώφρονος - † ἐν τῷ περὶ τοῦ Κρατῆρος ῥησειδίῳ - incertum
ad Glossas an ad Etymologumena referenda - Παρθικῶν - Ἀπολιποῦσα - Φιλάδελφοι ἢ Ἀποκαρ-
τερῶν - Γραμματειδιοποιός - Ἱέρεια - Προικιζομένη - Σφαττομένη - ἐν τῷ περὶ Θηρίων - ἐν τῷ
περὶ Μύρων καὶ Στεφάνων - causam dixit κατὰ Νεαίρας - ἐν τῷ περὶ Μύρων - Argonautica
- ἐν Ναυκράτεως Κτίσει - ἐν τῷ περὶ Ἀρχιλόχου - ἔγραψε περὶ τῶν τοῦ πατρὸς ποιημάτων
σύγγραμμα - ὁ περὶ τούτων (i.e. de conviviis Aegyptiorum) γεγραφώς - ἐν Τριηρικῷ - Δαλίς -
Κρῆτες - ἐν τῷ Ἀρίστωνι - Ἄδωνις - Καμπυλίων - Ἀραρὼς ἢ Εὔβουλος ἐν Καμπυλίωνι - Πα-
νὸς Γοναί - Ὑμέναιος - Διαμαρτάνων - ἐν τοῖς Ἰάμβοις - ἐν Ἰδιοφυέσιν - ἐν τῇ γ´ Εὐβοϊκῶν -
Γαστρολογία - Γαστρονομία - Δειπνολογία - Ἡδυπάθεια - Ὀψοποιία - Ἀρχεστράτεια δόγματα
- scripsit δύο βιβλία περὶ Αὐλητῶν - ἐν Ἐλεγείοις - Iamborum - ἐν Τετραμέτροις - Epodorum
- Ἐπίγραμμα - ἐν δευτέρῳ Ἀμφιτρύωνι - Ἡρακλῆς Γαμῶν - Ἰχθύες - Ῥίνων - scripsit περὶ Αὐ-
λῶν - scripsit Ὀψαρτυτικά - Παιὰν εἰς τὴν Ὑγίειαν - Μαμμάκυθος - ἐξηγούμενος Anacreontem
- ἐξηγούμενος Ionis tragoedias - ad Homerum - incerti loci - ἐν τῷ περὶ Κιθαρῳδῶν - Κῆρες -
Cyclopis - περὶ Παροιμιῶν - eius dogmata - Ἐρωτικῶν Ὁμοίων - τὰ κατ᾽ Ἀλέξανδρον - Ἱστορίαι
- ἐν τῷ περὶ Μουσικῆς - περὶ Χορῶν - ἐν τῷ περὶ Χορῶν - Ἐπιστολή - Λακωνικῶν - Γελοίων
Ἀπομνημονευμάτων - ἐν τοῖς Γελοίοις Ἀπομν. - περὶ Πινδάρου - ἐν τῷ κατὰ Φρύνης λόγῳ
- Γόητες - Διόνυσος - Τῶν πρὸς τὰς ἱερουργίας - Ἥλιος Ῥιγῶν - Θησεύς - Αἰολοσίκων - Αἰο-
λοσίκωνι δευτέρῳ - Ἀμφιάραος - Ἀνάγυρος - Ἀχαρνῆς - Βαβυλώνιοι - Βάτραχοι - Γεωργοί -
Γῆρας - Γηρυτάδης - Δαίδαλος - Δαιταλῆς - Δράματα ἢ Νίοβος - ἐν Δράμασιν - ἐν δευτέρῳ
Νιόβῳ - Εἰρήνη - Ἐκκλησιάζουσαι - Ἥρωες - Θεσμοφοριάζουσαι - Θεσμοφοριάζουσαι β´ - ἐν
Θεσμοφοριαζούσαις - Κένταυρος - Κώκαλος - Λυσιστράτη - Νεφέλαι - Νεφέλαι δεύτεραι - ἐν
ταῖς προτέραις Νεφέλαις - ἐν Νεφέλαις - Νῆσοι - Νίοβος - Ὁλκάδες - Ὄρνιθες - Πελαργοί -
Πλοῦτος δεύτερος - ἐν Πλούτῳ - Προαγῶν - Σκευαί - Σκηνὰς Καταλαμβάνουσαι - Σφῆκες
- Ταγηνισταί - Τελμησσῆς - Τριφάλης - Φοίνισσαι - Ὧραι - ἐν Ἀττικαῖς Λέξεσιν - ἐν τῷ περὶ
τῆς Ἀχνυμένης Σκυτάλης - ἐν τῷ περὶ Ἡλικιῶν - ἐν τοῖς πρὸς τοὺς Καλλιμάχου Πίνακας -
ἐν Λακωνικαῖς Γλώσσαις - ἐν τῷ περὶ Προσώπων - Καλλωνίδης - Πειρίθους - Πλάτων - Πυ-
θαγοριστής - Φιλωνίδης - ἐν τῇ Ἀπολογίᾳ τῆς ἀσεβείας - εἰς Ἑρμείαν τὸν Ἀταρνέα carmen -
Ἐρωτικῶν - ἐν τῷ περὶ Εὐγενείας - Ζώων Ἱστορίας - ἐν τοῖς (s. τῷ) περὶ Ζώων (s. Ζωικῶν) - ἐν
τῷ ἐπιγραφομένῳ Ζωικῷ ἢ περὶ Ἰχθύων - ἐν τῷ περὶ Ζωικῶν ἢ Ἰχθύων - ἐν τῷ περὶ Σώων καὶ
Ἰχθύων - ἐν τῷ περὶ Ἰχθύων - ἐν τῷ περὶ Ζώων ἢ περὶ Ἰχθύων - ἐν τῷ περὶ Ἰχθύων ἢ Ζωικῶν
- ἐν τῷ περὶ Ζώων Ἠθῶν καὶ Βίων - (περὶ) Ζώων Μορίων vel Μορίων (om. Ζώων) - ἐν τοῖς
Θαυμασίοις - ἐν τῷ περὶ Μέθης - Meteorol. - Νόμιμα Τυρρηνῶν - Νόμοι Συμποτικοί - Βασιλικοὶ
Νόμοι - ἐν τῷ περὶ Ποιητῶν - Πολιτεῖαι - ἐν τῇ Κολοφωνίων Πολιτείᾳ - Προβλήματα Φυσικά -
Rhetor. ad Alex. - Συμπόσιον - Ὑπομνήματα Ἱστορικά - ἐν τῷ περὶ Φυτῶν - Aristotelea varia -
ἐν τῷ Ἀρχύτα Βίῳ - † ἐν τοῖς περὶ Αὐλητῶν ἢ ἐν τοῖς περὶ Αὐλῶν᾽ ἢ Ὀργάνων - περὶ Αὐλῶν
Τρήσεως - περὶ Μουσικῆς - Πολιτικῶν Νόμων - Συγκρίσεων - ἐν τοῖς Συμμίκτοις Συμποτικοῖς

- ἐν τοῖς κατὰ βραχὺ Ὑπομνήμασιν - τῶν Γεωγραφουμένων - ἐν Ἰωνικοῖς Ὑπομνήμασιν - περὶ Δωρίδος - Ὀψαρτυτικαὶ Λέξεις - ἐν ταῖς Ὀψαρτυτικαῖς Γλώσσαις - ἐν τῷ Περὶ συναγωγῆς βιβλίων - ἐν δευτέρῳ Βιβλίων Χρήσεως - περὶ Διονυσιακοῦ Συστήματος - ἐν τῷ περὶ τῆς Νεστορίδος - ἐν τοῖς Τραγῳδουμένοις - ἐν τῷ Περὶ Δημητρίου τοῦ Φαληρέως συγγράμματι - Αἰγυπτιακῶν - epigr. - τὰ περὶ τὸν Ἔρωτα - ἐν τοῖς καταλογάδην Ἰάμβοις - ἐν τοῖς φερομένοις ὡς αὐτῆς Ἔπεσιν - Ἑρμῆς - Ἡρακλῆς σατυρικός - Σικελικῶν - ἐν τοῖς Περὶ τῶν ἐν Συρίᾳ βασιλευσάντων - Σαμόθρακες - ἐν τῷ Περὶ σπουδῆς καὶ παιδιᾶς - Ἀχαϊκῶν - ἐν τοῖς Ἀχαϊκοῖς - Φιλευριπίδης - Φίλιννα - Χαλκιδικός - scripsit τὸν Κανόνα καὶ τὰς Γνώμας libros pseudepicharmeos - ἐν τῷ ἐπιγραφομένῳ Σταθμοὶ τῆς Ἀλεξάνδρου πορείας - ἐν Ἐρωτικοῖς - τῶν Ἰνδικῶν - ἐν τοῖς Περὶ τῶν ἐν Ἐφέσῳ τυράννων - ἐν τῷ περὶ Θεσσαλίας καὶ Αἱμονίας - ἐν τῷ Περὶ τῆς τοῦ Ἱερωνύμου τυραννίδος - ἐν τοῖς περὶ Ἴωνος τοῦ ποιητοῦ - Ἀνδροφόνος - Εὐεργέται - Συνεξαπατῶν - Βαβυλωνιακῶν - ἐν Αἰθιοπικοῖς - ἐν τῷ πρὸς Ἄτταλον περὶ Ὀργάνων - Μεσοτρίβας - Σατοῦρνος - ἐν Ὀρνιθογονίᾳ - scripsit Ἁλιευτικά - librum edidit πέρι τῶν Δουλικῶν Πολέμων - ἐν τῷ περὶ Ἱστορίας - Ἄγνοια - Calliae fab. inc. - Κύκλωπες - Πεδῆται - Γραμματικὴ Θεωρία - ἐν τῷ Περὶ τῆς παρ᾽ Ἀλκαίῳ λεπάδος - τῶν περὶ Ἀγαθοκλέα Ἱστοριῶν - Μοσχίων - ἐν Γαλατείᾳ - ἐν Ἐθνικαῖς Ὀνομασίαις - ἐν τῇ Ἑκάλῃ - ἐν τοῖς Ἐπιγράμμασιν - Ἐπινίκιον ἐλεγειακὸν εἰς Σωσίβιον - ἐν τῷ περὶ Ὀρνίθων - ἐν τῷ περὶ Ὀρνέων - ἐν τῷ τρίτῳ Πίνακι τῶν Νόμων - ἐν τῷ τῶν Παντοδαπῶν Πίνακι - ἐν τῇ τῶν Ῥητορικῶν Ἀναγραφῇ - Fabularum tabulae - ἐν Ἱστορικοῖς Ὑπομνήμασιν - Elegiarum - ἐν τοῖς Ἐλεγείοις - Παννυχίς - ἐν ταῖς Ἑλληνικαῖς - ἐν τῷ περὶ τοῦ Ἱεροῦ Πολέμου - Στρατονίκου Ἀπομνημονεύματα - Συμμίκτων - ἐν Ὑπομνήμασι Θραττῶν Κρατίνου - περὶ Ἀλεξανδρείας - τοῖς περὶ Ἀλεξανδρείας - Συμμαχία - τῶν πρὸς Φιλόπαππον Ὑπομνημάτων - Ἀχιλλεύς - Σεμέλη - Ὑπομνημάτων - ἐν τῷ περὶ Διδασκαλιῶν - ἐν τῷ περὶ Σωτάδου συγγράμματι - εἰς τὸν Πᾶνα ποίημα - ἐν τῷ τοῦ Ἡρακλέους Ἐγκωμίῳ - Ἐγκώμιον Λαγίδος τῆς ἑταίρας - Ἀμαζόνες - Ὕς - τῶν πρὸς Ἀριστοτέλην - ἐν τοῖς κατὰ Ἀριστοτέλους - Αἰγίμιος - Ἀλφεσίβοια - Ἰώ - Μινύαι - Οἰνεύς - ἐν τῷ περὶ Αἰσχύλου - ἐν τῷ περὶ Ἀνακρέοντος - ἐν τῷ περὶ Ἡδονῆς - περὶ Κωμῳδίας - ἐν τῷ περὶ τοῦ Λάσου - ἐν τῷ περὶ Πινδάρου - ἐν τῷ Προτρεπτικῷ - ἐν τῷ περὶ Σαπφοῦς - ἐν τῷ περὶ Σιμωνίδου - ἐν τῷ περὶ Στησιχόρου - τῶν Ἱστοριῶν - ἐν ταῖς (περὶ Ἀλέξανδρον) Ἱστορίαις - περὶ τοῦ Ἀστικοῦ Ἀγῶνος - Ἄλυσις - ἐν τοῖς Περσικοῖς - ἐν δευτέρῳ Ὥρων - ἐν τοῖς Ὥροις - Πτωχοί - Persicorum - ἐν τῷ Περὶ τῶν δι᾽ αὐτὰ αἱρετῶν - ἐν τῷ Περὶ τῶν μὴ δι᾽ αὐτὰ αἱρετῶν - ἐν τῇ εἰσαγωγικῇ περὶ ἀγαθῶν καὶ κακῶν πραγματείᾳ - Περὶ τοῦ καλοῦ καὶ τῆς ἡδονῆς - ἐν τῷ Περὶ τοῦ καλοῦ - περὶ Ὁμονοίας - libro non indicato - Sardanapalli carmen sepulcrale a Chr. immutatum - ἐν τῷ Ἀρτοκοπικῷ - scripsit τὴν Πολιτείαν librum pseudepicharmeum - carmen - ἐν τῷ περὶ Μεταλήψεως - ἐν τῷ Γεργιθίῳ - περὶ Γρίφων - ἐν τῷ περὶ Γρίφων - ἐν τῷ περὶ τῶν Ἐνύδρων - ἐν τῷ Περὶ τῶν ἐν ὑγρῷ - τῶν Ἐρωτικῶν - ἐν Ἐρωτικῶν - ἐν τοῖς Ἐρωτικοῖς - ἐν τῷ περὶ † Θινῶν - ἐν τῷ περὶ Νάρκης - περὶ Παιδείας - ἐν τῷ περὶ τοῦ Πανικοῦ - περὶ Παροιμιῶν ἐν τῷ προτέρῳ - ἐν τοῖς περὶ Παροιμιῶν - ἐν τῷ Περὶ τῶν ἐν τῇ Πλάτωνος Πολιτείᾳ μαθηματικῶς εἰρημένων - περὶ Σκελετῶν - περὶ Φιλέας - ἐν περὶ Φιλέας - Κορίνθιοι - Πάνδροσος - aenigmata - ἐν τῷ ἐπιγραφομένῳ (διθυράμβῳ) Μελεάγρῳ - ἐν τῇ πρὸς Ἀλέξανδρον Ἐπιστολῇ - Ἀστρολογία - τῆς Ἀτθίδος - ἐν τῇ Ἀτθίθι - Ἐξηγητικόν - ἐν Πρωτογονίας

πρώτῳ - Γλωσσῶν - ἐν τῇ περὶ Γλωσσῶν πραγματεία - τῶν περὶ Ἀλέξανδρον (Ἰστοριῶν) - ἐν ταῖς π. Ἀλ'. Ἰστορίαις - περὶ Μιλήτου - ἐν τοῖς περὶ Μιλήτου - ἐν τῷ περὶ τῆς Ῥωμαίων Πολιτείας - Γείτονες - Θηρία - Λάμια - Παιδιαί - Ῥήτορες - Σάμιοι - Τόλμαι - carm. - Ἀττικῆς Διαλέκτου - ἐν Ἀττικῆς Διαλέκτου - ἐν τοῖς περὶ τῆς Ἀττικῆς Λέξεως - Ἀρχίλοχοι - Βουκόλοι - Δηλιάδες - Διονυσαλέξανδρος - Δραπέτιδες - Εὐνεῖδαι - Θρᾳττῶν ὑπομνήματα - Κλεοβουλῖναι - Μαλθακοί - Νέμεσις - Νόμοι - Ὀδυσῆς - Πλοῦτοι - Πυτίνη - Χείρωνες - Γίγαντες - Θηραμένης - Τιτάνες - Χείρων - ἐν τοῖς Ἐφεσίων Ὥροις - carminis epici - ἐν Θετταλῶν Πολιτείᾳ - ἐν τῇ Λακεδαιμονίων Πολιτείᾳ - Πειρίθους tragoedia - Φιλοπράγμων - Ἀπαγχόμενος - Ψευδυποβολιμαῖος - Περσικῶν - ἐν τῷ Περὶ τῶν κατὰ τὴν Ἀσίαν φόρων - scripsit περὶ τῆς Ὑδραύλεως - Χρονικῶν - Χρόνων - ἐν τοῖς Ἰνδικοῖς - οἱ περὶ Δάμωνα τὸν Ἀθηναῖον - ἐν τῷ περὶ Βυζαντίου - Αὑτὸν Πενθῶν - ποιημάτιον ἀναφέρεται εἰς Δ. Τρίφυλλον - περὶ Ποιημάτων - ἐν τῷ περὶ τῆς Ἀλεξανδρέων Διαλέκτου - Ἐτυμολογουμένων - ἐν Ἐτυμολογίᾳ - ἐν τοῖς Ὁμωνύμοις - Τρωικοῦ διακόσμου - Σικελία - Ἀρεοπαγίτης - ἐν τῷ Περὶ τῶν κατ' Αἴγυπτον - Ἀτθίδος - ἐν τῷ ὑπὲρ Σοφοκλέους πρὸς Φίλωνα - Περὶ τοῦ ἐν Ἐφέσῳ ναοῦ - ἐν τῷ περὶ Ἁλικαρνασσοῦ - Ἀχελώιος - ἐν τῷ κατὰ Ἀνδροτίωνος - ἐν τῷ περὶ Ἀτελειῶν - ἐν τῳ κατὰ Εὐέργου καὶ Μνησιβούλου - ἐν τῷ ὑπὲρ Κτησιφῶντος - ἐν τῷ κατὰ Μειδίου - ἐν τῷ κατὰ Νεαίρας - ἐν τῷ κατὰ Ν. - ἐν τῷ κατὰ Ν. λόγῳ - ὁ τὸν κατὰ Ν. γράψας λόγον - ἐν τῷ περὶ τῆς Παραπρεσβείας - ἐν τῷ πρὸς Τιμόθεον ὑπὲρ χρέως - ἐν τοῖς Φιλιππικοῖς - ἐν τῷ περὶ Χρυσίου - Ὑφ' ἑαυτῶν Πλανώμενοι - ἐν τῷ περὶ Ἀλκαίου - Περὶ τοῦ τῆς Ἑλλάδος βίου - ἐν τοῖς π. τ. τ. Ἑ. β. - ἐν τῷ Περὶ τῆς ἐν Ἰλίῳ θυσίας - ἐν τῷ Ὀλυμπικῷ - ἐν τῷ Τριπολιτικῷ - τῆς εἰς Τροφωνίου Καταβάσεως - ἐν τοῖς περὶ τῆς εἰς Τρ. κατ'. - Διατριβῶν - ἐν ταῖς εἰς Ἴωνα Ἀντεξηγήσεσιν - comment. Achaei Ἆθλα - comment. Arist. Pluti - ἐξηγούμενος - comment. in Sophoclis Phoenicis - e libris incertis - ἐν τοῖς Μεγαρικοῖς - τῶν Περσικῶν - ἐν τῇ Περσικῇ πραγματείᾳ - ἐν τῷ περὶ Θανασίμων Φαρμάκων - τῶν πρὸς Πλείσταρχον Ὑγιεινῶν - Ὑγιεινῶν - ἐν τοῖς πρὸς Πλείσταρχον - ἐν τοῖς Ὑγιεινοῖς - Θάλαττα - Μέλισσαι - ἐν Ἰταλικαῖς Γλώσσαις - ἐν τῷ πρὸς Λυκόφρονα - Αὐλητρίς - ἐν τοῖς περὶ Βιβλιοθήκης - ἐν τοῖς περὶ Εὐγενείας - ἐν τῷ πρώτῳ τῶν Νόμων - Κεφαλίων - ἐν τῇ Πολιτείᾳ - ἐν τῷ περὶ Διαλέκτων - ἐξηγούμενος Θεοδωρίδα εἰς τὸν Ἔρωτα μέλος - περὶ τοῦ Κύκλου - Ἀκοντιζόμενος - Θεσμοφόρος - Σώζουσα - περὶ Ὀνομάτων - ἐν τῷ περὶ Ὀνομάτων - libro non nominato - ἐν ταῖς πρὸς Σπεύσιππον Ἐπιστολαῖς τῇ Ἐπιστολῇ - distichorum compositio - ἐν Ὀψαρτυτικῷ - Παιανίς - περὶ τῶν παρ' Ὁμήρῳ Νόμων - Πολιτείας - ἐν τοῖς Ἀπομνημονεύμασιν - ἐν τῇ Ἡρακλείᾳ - ὁ γράψας τὰ κατ' Ἐπικούρου βιβλία - Ἀντιπορνοβοσκός - Ἰστοριογράφος - Φιλάργυρος - Αἱρησιτείχης - ἐν Εὐνούχῳ ἢ Στρατιώτῃ - Στρατιώτῃ - Ἀνασωζόμενοι - Ἄπληστος - Διαμαρτάνουσα - Ἑκάτη - Ἐλαιωνοφρουροῦντες - Ἔμπορος - Ἐναγίζοντες - Ζωγράφος - Ἥρως - Μνημάτιον - Παιδερασταί - Πελιάδες - Πολυπράγμων - Συνωρίς - ἐν τῇ διασκευῇ τοῦ αὐτοῦ δράματος - Τελεσίας - Τιθραύστης - ἐν τῷ περὶ τῶν Νικάνδρου Θηριακῶν - ἐν τῷ Περὶ τῶν προσφερομένων τοῖς νοσοῦσι καὶ τοῖς ὑγιαίνουσιν - sine titulo - epigramma - τῶν περὶ Ἀλέξανδρον Ἰστοριῶν - Περὶ Ἀντιφάνους καὶ περὶ τῆς παρὰ τοῖς νεωτέροις κωμικοῖς ματτύης - πρὸς τοῖς ἑκατὸν τῆς Λέξεων Συναγωγῆς - τῶν Κρητικῶν - ἐν τῷ περὶ Λίθων - Ψάλτριαι - ἐν τῷ περὶ Εὐριπίδου καὶ Σοφοκλέους - Ἰστοριῶν - Μακεδονικῶν - ἐν τοῖς Σαμίων Ὥροις - ἐν τῷ περὶ Τραγῳδίας - ἐν τοῖς Κρητικοῖς - Σάτυροι

- ἐν Ἀπομνημονεύμασιν - ἐν τῷ Ὀψαρτυτικῷ - ἐν τῷ Περὶ τῆς Ἀλεξάνδρου καὶ Ἡφαιστίωνος ταφῆς - Ἄρτεμις - Βούσ(ε)ιρις - Γηρυόνης - Ἐμπολή - Ἔφηβοι - Κύδων - Ναυαγός - Ὅμοιοι ἢ Ὀβελιαφόροι - Ὀβελιαφόροι - Πελταστής - Φιλύρα - περὶ Εὑρημάτων - ἐν τοῖς περὶ Εὐρ. - ἐν τοῖς Εὑρήμασιν - Ἀγρωστῖνος - Ἀλκυών - Ἀταλάνται - Γᾶ (bis Γῆ) καὶ Θάλασσα - Διόνυσοι - Ἐλπὶς ἢ Πλοῦτος - ἐν Ἐλπίδι - Ἑορτὰ καὶ Νᾶσοι - Ἥβας Γάμος - ἐν Ἥβης Γάμῳ κἀν Μούσαις - Θεαροί - Κωμασταί - Λόγος καὶ Λόγιννα - Μεγαρίς - Μοῦσαι - Ὀδυσσεὺς Αὐτό-μολος - Ὀδυσσεὺς Ναυαγός - Ὀρύα fabula - Περίαλλος - Πύρρα καὶ Προμαθεύς - ἐν Πύρρᾳ - Σειρῆνες - τὰ εἰς Ἐπίχαρμον ἀναφερόμενα ποιήματα - Ἀντιλαΐς - Τριόδους ἢ Ῥωποπώλης - ἐν τῇ περὶ Ἐπιτηδευμάτων Ἐπιστολῇ - διὰ τῶν πρὸς Ἕρμαρχον Ἐπιστολῶν - Συμπόσιον (p. 115 Us) - ἐν τῷ Συμποσίῳ - ἐν τῷ περὶ Τέλους - Βακχίς - ἐν Βακχίῳ - Ἡρωΐνη - ad Ionis Agam. - in Abrotonam Themistoclis matrem - in Arcadionis sepulcro - in Atheniensium sepulcro occisorum a Romanis in Delo insula - in Bacchiadem Sicyonium Thespiis - in Bacchidae sepulcro - in Cleonem Thebanum - in Cratinum - in Eleos scopticum - in Erasixeni sepulcro - ? Heliconis Salaminii textoris Delphis - in Laidis sepulcro - in Machonis sepulcro - ? Myis caelatoris - in Pausaniam regem - in Philetae sepulcro - in Pythagoram - in Sardanapalli sepulcro - in Thrasymachi sepulcro - in Timocreontis sepulcro - scopticum de philosophis - Delphica: in gladio Antenoridae - in tripode a Diomede dedicato - ἐν τῇ Σικυωνίᾳ (Ἀναγραφῇ) traditum - Κωραλίσκος - Μνη-σιπτόλεμος - Ὑποβαλλόμενοι - ἐν τῇ Περὶ τῶν καθόλου πραγματείᾳ - ἐν τῷ ἐπιγραφομένῳ Ἀρίστωνι - ἐν τῷ ἐπιγραφομένῳ Ἀρσινόη συγγράμματι - ἐν τῇ πρὸς Ἀγήτορα τὸν Λάκωνα Ἐπιστολῇ - ἐν ταῖς Ἐπιστολαῖς - περὶ κωμῳδίας - ἐν πρώτῳ Ὀλυμπιονικῶν - Carmina - ἐν τοῖς περὶ τῆς πατρίδος - ἢ ὁ πεποιηκὼς τὸ εἰς αὐτὴν ἀναφερόμενον ποιημάτιον - Μελίβοια - ἐν Κολοφωνιακοῖς - ἐν τοῖς Ἐφεσιακοῖς - Ἀνακαλυπτομένη - ἐν τῷ εἰς τὸν Γλαῦκον ὕμνῳ - Ἀγ-κυλίων - Ἀμάλθεια - Ἀντιόπη - Ἄστυτοι - Αὔγη - Βελλεροφόντης - Διονύσιος - Δόλων - Εὐρώπη - Ἠχώ - Ἴων - Κατακολλώμενος - Κέρκωπες - Κλεψύδρα memoratur - Λάκωνες ἢ Λήδα - ἐν Λήδᾳ - Μήδεια - Μυλωθρίς - Μυσοί - Νάννιον - Ναυσικάα - Ὀδυσσεὺς ἢ Πανόπται - Οἰδίπους - Ὀλβία - Ὀρθάννης - Πάμφιλος - Πορνοβοσκός - Πρόκρις - Προσουσία ἢ Κύκνος - Σεμέλη ἢ Διόνυσος - Στεφανοπώλιδες - Σφιγγοχαρίων - Τίτται - Φοῖνιξ - Χρύσιλλα - Ψάλτρια - ἐν δρά-ματι Κωμασταῖς - Γῆς Περιόδου - τῆς Ἱερᾶς Ἀναγραφῆς - ἐν Ῥιζοτομικῷ - τῶν περὶ Ἀννίβαν Ἱστοριῶν - Σφαττόμενος - ἐν ταῖς Ἐφημερίσιν Ἀλεξάνδρου - τὰ πάτρια - ἐν Γεράνῳ - ἐν τῷ περὶ Ἰσθμίων - ἐν τῷ περὶ Μελοποιῶν - ἐν Χιλιάσιν - Ἀποδιδοῦσα - Παραδιδομένη - Συνέφη-βοι - ἐν Ὑπομνήμασιν - Αἶγες - Ἀστράτευτοι - Αὐτόλυκος - Βάπται - Δῆμοι - ὁ τοὺς Εἵλωτας ποιήσας - ἐν Εἵλωσι - Κόλακες - Μαρικᾶς - Προσπάλτιοι - Ταξίαρχοι - Φίλοι - Χρυσοῦν Γένος - Aeoli - Andromachae - Ἀνδρομέδας ἐπεισόδιον - Antigonae - Antiopae - Augae - ἐν τῷ πρώτῳ Αὐτολύκῳ - ἐν Βάκχαις - Danaae - Δεσμῶτις Μελανίππη - Εὐρυσθεύς - Ἱκετίδες - Ἱππόλυτος - Iphigeniae Aulid. - Μελανίππη Δεσμῶτις - Oedipi - Orestae - τὸν Πειρίθουν ὁ γράψας, εἴτε Κριτίας ἐστὶν ὁ τύραννος ἢ Εὐριπίδης - Πλεισθένης - Σθενέβοια - Telephi - Troadum - Φαέθων - Phoenissanim - Φριξὸς - Ἐπινίκιον in Alcibiadem - τὸν ἐπιγραφόμενον κατ' αὐτῆς (Phrynae) Εὐθίου λόγον Διόδωρος ὁ περιηγητὴς Ἀναξιμένους φησὶν εἶναι - Ἄσωτοι ἢ Ἐπιστολή - ἐν τῷ περὶ Λαχάνων - ἐν τῷ περὶ Ταρίχων - ἐν (τῷ) Ὀψαρτυτικῷ - νόμον συσσιτικὸν συνέγραψεν - ἐν τῷ Περὶ τῶν ἐν Ῥόδῳ θυσιῶν - ἐν Κορωνισταῖς - ἐν τῷ Περὶ τῶν κατὰ Φιγάλειαν νομίμων

- ἐν τῷ περὶ Πλακούντων - τῶν Γενεαλογιῶν - Περιηγήσεις - Ἐκ. ἐν Ἀσίας Περιηγήσει - ἐν Ἀσίας Περιηγήσει - ἐν τῇ Ἀσίᾳ ἐπιγραφομένη - ἐν τῇ τῆς Εὐρώπης Περιόδῳ - Περιηγήσεως - ἐν τῇ ἐπιγραφομένη Σκύλλη - Δείπνου ἀναγραφή - κωμῳδία εἰς τὸν ἀρχαῖον τρόπον, ἣν ἐπιγράφουσιν Φιλίνην (s. Φίλινναν) - ἐν Φιλίννῃ - Παρῳδίαι - Γιγαντομαχία parodia - carminis incerti - Ὑπομνήματα - ἐν τῷ ἐπιγραφομένῳ Ὑπομνήματι Ἀνδριάντων καὶ Ἀγαλμάτων - ἐν (τοῖς) Ὑπομνήμασιν - ὁ τὰ Κεφαλίωνος ἐπιγραφόμενα Τρωικὰ συνθείς - ὁ τὰς Ἱστορίας γράψας - ποιήματα (?) - Φιλέταιροι - περὶ Ἀκροπόλεως - ἐν τοῖς περὶ Ἀκροπόλεως - ἐν τοῖς Αἰγυπτιακοῖς - ἐν τῇ εἰς Ἄμμωνος Ἀναβάσει - Δευκαλιωνείας - ἐν Ἐθνῶν Ὀνομασίαις - ἐν ταῖς Ἱστορίαις - ἐν Καρνεονίκαις, ἔν τε τοῖς ἐμμέτροις κἂν τοῖς καταλογάδην - ἐν Κτίσεσιν - τῆς Φορωνίδος - Γοργόνες - Πολύευκτος - Τροχίλος - Περὶ τοῦ παρ᾽ Ἀνακρέοντι λυγίνου στεφάνου - Περὶ τοῦ παρὰ Ξενοφῶντι ἐν τοῖς Ἀπομνημονεύμασιν Ἀντιφῶντος - τῶν ἐπιγραφομένων Παρασκευαστικῶν - ἐν τοῖς Παρασκευαστικοῖς - περὶ Δικαιοσύνης - ἐν τῷ περὶ Δικαιοσύνης - ἐν τῷ περὶ Ἐρωτικῶν - ἐν τρίτῳ περὶ Μουσικῆς - lescharum versiculus † ἐν τῷ περὶ Θεσμῶν - ἐν τῷ Ξενίφοντι - Λεόντιον carmen tribus libris compositum - ἐκ τῶν Ἰάμβων - ἐν τρίτῃ Σικελικῶν - τῶν περὶ τοῦ Γρυνείου Ἀπόλλωνος - Ἀρτοπώλιδες - Δημόται - Θεοί - Στρατιῶται - Φορμοφόροι - Ἴαμβοι - περὶ Ἀριστοτέλους - ἐν τῷ περὶ Γοργίου - ἐν τοῖς περὶ τῶν Ἑπτὰ Σοφῶν - ἐν τοῖς περὶ Ἱππώνακτος - ἐν τῷ περὶ Ἰσοκράτους - ἐν τοῖς Περὶ τῶν Ἰσοκράτους μαθητῶν - Νομοθετῶν - περὶ Νομοθ. - ἐν τοῖς περὶ Νομοθ. - Paeanes - ἐν Κρητικαῖς Γλώσσαις - ἐν Γλώσσαις - ἐν Συνωνύμοις - τῶν Κωμῳδουμένων - ἐν τοῖς Συμμίκτοις Ὑπομνήμασιν - ἐν τοῖς πρὸς τὸν Φιλοσωκράτην - τοῦ καθ᾽ Ἡρακλέα Λόγου - ἐν τῷ περὶ Σύκων - ἐν Συνεργαζομέναις - ἐν Ὥροις Κολοφωνίων - ἐν τῇ Ἀσπίδι - ὁ τὴν εἰς Ἡσίοδον ἀναφερομένην ποιήσας Ἀστρονομίαν - Ἔργων - αἱ εἰς Ἡσίοδον ἀναφερόμεναι Μεγάλαι Ἠοῖαι καὶ Μεγάλα Ἔργα - ἐν ταῖς Ἠοίαις - ἐν Κήυκος Γάμῳ - Μελαμποδίας - ἐν τῷ Μελαμποδίας - ἐν τῇ Μελ. - Hesiodi carmen spurium - περὶ Ὕλης - ἐν τοῖς περὶ Ὕλης - ἐν τῷ περὶ Κιθαρῳδῶν, ὅπερ ἐστὶ πέμπτον τῶν περὶ Ποιητῶν - ἐν τοῖς Ἱστορικοῖς Ὑπομνήμασιν - περὶ τῆς Καρχηδονίων Πολιτείας - Θαΐς - ὁ τὴν Αἰγυπτιακὴν Ἰλιάδα συνθείς (3.101a) - τῶν περὶ τῆς πατρίδος Ἱστοριῶν - ἐν τῷ ἐπιγραφομένῳ Συναγωγή - ἐν τῷ περὶ Διαίτης - ἐν τῷ περὶ Πτισάνης - ἐν τῷ περὶ Τόπων - ἐν τῷ περὶ Ὑδάτων - libro nom indicato - Δειπνητικαὶ Ἐπιστολαί ad Lynceum Samium - ἐν τῇ πρὸς Λυγκέα ἐπιστολῇ - Ἰλιάδος - Ὀδυσσείας - Ἐπιχιλίδες - ἐν τῷ εἰς Ἀπόλλωνα ὕμνῳ - ἐκ τῶν εἰς Ὅμηρον ἀναφερομένων - σκόλιον - ἐν τῷ κατὰ Ἀρισταγόρας - ἐν τῷ κατὰ Ἀρισταγόρας β´ - Δηλιακῷ - ἐν τῷ κατὰ Δημάδου - ἐν τῷ κατὰ Δημοσθένους - ἐν τῷ κατὰ Μαντιθέου αἰκίας - ἐν τῷ κατὰ Πατροκλέους - κατὰ Φιλιππίδου - ἐν τῷ ὑπὲρ Φρύνης - ἢ ὁ ποιήσας τὰ εἰς αὐτὸν ἀναφερόμενα Κυμαϊκά - Περὶ τῶν Ἀλεξάνδρου ἱερῶν - ἐν Ἀρτοποιικῷ - Μελῶν - ἐν (τοῖς) Ἐλεγείοις - ἐν (ταῖς) Ἐπιδημίαις - ἐν τῷ περὶ Χίου - Tragoediae - ἐν τῷ τῆς Παρθίας Περιηγητικῷ - ἐν τῷ Ἀρεοπαγιτικῷ - ἐν τῷ περὶ Ζεύγους - ἐν ταῖς πρὸς Τιμαῖον Ἀντιγραφαῖς - ἐν τοῖς Ἀργολικοῖς - τῶν Ἀττικῶν - ἐν τοῖς Ἀττικοῖς - Πτολεμαΐδος τῆς ἐν Αἰγύπτῳ πόλεως - Ἐπίγραμμα in Leonteum histrionem tragicum - Θεατρικῆς Ἱστορίας - ἐν τοῖς περὶ Λιβύης - ἐν ταῖς Ὁμοιότησιν - Λυδῆ carmen melicum - Ὕμνος εἰς τὴν ἐν Ἑρμιόνι Δήμητρα ἄσιγμος - ἡ ἄσιγμος ᾠδή, ἥτις ἐπιγράφεται Κένταυρος - Ἁλιευτικὰ καταλογάδην - Φράτερες - ἐν Διθυράμβοις - incerti carminis - ἐν τῷ περὶ Πυθαγορείου - ἐν τοῖς περὶ Κῶμ. - Μενέδη-

μος σάτυροι - ἐν τῷ κατὰ Λεωκράτους - ἐν τῷ κατὰ Λυκόφρονος - ἐν τοῖς Ἀποφθέγμασιν - Ἐπιστολαὶ Δειπνητικαί ad Hippolochum Macedonem - ἐν τῇ πρὸς Ἀπολλόδωρον Ἐπιστολῇ - ἐν τῇ πρὸς Ἐπιστολῇ - ἐν τῇ πρὸς τὸν κωμικὸν Ποσείδιππον Ἐπιστολῇ - ἐν Ἐπιστολαῖς - comoedia - loci incerti - περὶ Ἰαμβοποιῶν - ἐν τοῖς περὶ Ἰαμβοπ. - πρὸς Αἰσχίνην - ἐν τῷ κατὰ Ἀλκιβιάδου λόγῳ - περὶ Ἐγγυθήκης ἐπιγραφόμενός τις λόγος ἀναφέρεται εἰς Λυσίαν - ἐν τῷ κατὰ Θεοπόμπου αἰκίας - ἐν τῷ κατὰ Λαΐδος - ἐν τῷ πρὸς Μέδοντα ψευδομαρτυριῶν - ἐν τῷ κατὰ Μικίνου φόνου - ἐν τοῖς τῶν Συμβολαίων λόγοις, ἐν τῷ πρὸς Αἰσχίνην τὸν Σωκρατικὸν χρέως - ἐν τῷ ὑπὲρ Φανίου παρανόμων - ἐν τῷ κατὰ Φιλωνίδου βιαίων - ἐν τῷ περὶ Χρυσοῦ Τρίποδος - περὶ τῆς Ἀττάλου Παιδείας συγγέγραφε βίβλους πᾶσαν κολακείαν ἐμφαινούσας - Νόστων - Κῴακων - ἐν ταῖς ἐπιγραφομέναις Χρείαις - συνέγραψεν ἓν τῶν Παραγγελμάτων φορτικώτερον - ἐν Διονύσῳ πρώτῳ - ἐν Διονύσῳ δευτέρῳ - ἐν Λυδοῖς - ἐν τοῖς Σιφνίων Ὥροις - Atacta? - Δείπνου ἀναγραφὴν πεποίηται - ἐν τῷ Δείπνῳ - Ἀττικὸν δεῖπνον διαγράφει - ἐν (ταῖς) Παρῳδίαις - ἐν τῷ Περὶ ἐνδόξων ἀνδρῶν - ἐν ταῖς Δαναΐσιν - ἐν τῷ Μαρσύα - ἐν τῷ Περὶ τῶν ἐν Ἐλευσῖνι μυστηρίων - ἐν ταῖς Χάρισιν - ἐν τοῖς Σικυωνιακοῖς - ἐν τοῖς περὶ Τεχνιτῶν - Ἁλιεῖς - (ἐν) Ἁλιεῖ - Ἀνδρόγυνος ἢ Κρής - Ἀνεψιοί - Ἀρρηφόρος ἢ Αὐλητρίς - Αὐλητρίσι - Αὑτὸν Τιμωρούμενος - Δημιουργός - Δίδυμαι - Δύσκολος - Ἐγχειρίδιον - Ἐμπιμπραμένη - Ἐπίκληρος πρώτη - Ἐπιτρέποντες - Ἐφέσιος - Θαΐς fabula - Θεοφορουμένη - Θρασυλέων - Καρχηδόνιος - Κεκρύφαλος - Κόλαξ - Μέθη - Μηναγύρτης - Μισογύνης - Ναύκληρος - Νομοθέτης - Ὀργῆ - Παιδίον - Παλλακή - Παρακαταθήκη - Περινθία - Πωλούμενοι - Ῥαπιζομένη - Συναριστῶσαι - Ὑδρέα - Ὑμνίς - Φάνιον fabula - Φάσμα - Χαλκεῖα - Ψευδηρακλῆς - τῆς Συναγωγῆς - Πολιτικῶν - ἐν τῷ περὶ Ἀναθημάτων - ἐν τῷ Ἀρκεσιλάῳ - ἐν τῷ Περὶ τῶν κατὰ τὸ ἱερὸν τῆς Σαμίας Ἥρας - Τῶν κατὰ τὴν Σάμον ἐνδόξων ἀναγραφή - Αὖραι - ἐξ Αὐρῶν - Θουριοπέρσαι, ἀδίδακτον - Φιλοθύτης - περὶ Ἀλειπτικῆς - ἐν τῷ περὶ Συνηθείας - ἐν Τρωικοῖς - Ναννώ - Ναννοῖ - ἐν Ἐπιγράμμασιν - hunc συνταξάμενον τὰ ἐπιγραφόμενα Παίγνια διὰ τὸ ποικίλον τῆς συναγωγῆς Σάλπην οἱ συνήθεις προσηγόρευον - περὶ Ἀσίας - (τῶν) Εὐρωπιακῶν - ἐν τῷ Περίπλῳ - Ἱπποτρόφος - Φίλιππος - Ἱστορία - ἐν τῷ περὶ Ἐδεστῶν - ἐν τῇ περὶ Κωθωνισμοῦ Ἐπιστολῇ - ὁ τὰ Φοινικικὰ συγγραφώς - ἐν τῇ Μνημοσύνη ἐπιγραφομένη - περὶ τῆς ὑπὸ Ἱέρωνος τοῦ Συρακοσίου κατασκευασθείσης νεώς - Μηχανικῶν - ἐν ἐξηγήσει Ῥοδιακῶν Λέξεων - Μεσσηνιακῶν - ἐν Ἱστορικοῖς Παραδόξοις - Ναύκληροι - Πέρσις - τῶν περὶ Ἄτταλον Ἱστοριῶν - Ἑλληνικῶν - τῶν Ἑλληνικῶν Ἱστοριῶν - τῶν Ἑλληνικῶν - ἐν τοῖς Μυθικοῖς - περὶ Τελετῶν - Ὥρων - ἐν τῇ Διονυσιάδι - ἐν τῷ περὶ Ἐπιγραμμάτων - ἐν τοῖς Θεατρικοῖς Ὑπομνήμασιν - Γυναικῶν Κατάλογος - ἐν τοῖς Ἀττικοῖς Ὀνόμασιν - Περιπετειῶν - Προυσίου Συμπτωμάτων - (τῶν) Αἰτωλικῶν - ἐν Γεωργικοῖς - ἐν (ταῖς) Γλώσσαις - Ἑτεροιουμένων ἐν τετάρτῳ - ἐν Ἑτεροιουμένοις - Εὐρώπιας - ἐν Θηριακῷ - ἐν (τοῖς) Θηριακοῖς - Κολοφωνιακῶν - ἐν Μελισσουργικοῖς - Οἰταικῶν - loco non indicato - ἐν Μετονομασίαις - ἐν ταῖς Διαδοχαῖς - ἐν τῇ περὶ τῶν Φιλοσόφων ἱστορίᾳ - ἐν τοῖς Ἀρκαδικοῖς - ἢ ὁ ἀναθεὶς ταύτῃ τὰ συγγράμματα - Ἡρακλῆς Χορηγός - Λάκωνες - Εἰλείθυια - περὶ Ἑορτῶν Αἰγυπτίων - ἐν τῷ περὶ Ὀρφέως - ἐν τοῖς Ἐγχειρογάστορσιν - Χειρογάστορες - Πανδώρα - Ἅβρα - Ἀντερῶσα - Ἄντυλλος - Ἀπελαυνόμενος - Βασιλεῖς - Διάβολος - Ἡσίοδος - Ἱεροφάντης - Κλίνη - Μάγειρος - Οἰνοποιός - Πατριῶται - Πλοῦτος - Σύρος - Τοκιστής - Ψευδοστιγματίας - ἐν Ἁλιευτικῷ -

περὶ Ἡρακλείας - ἐν Περίπλῳ Ἀσίας - ἐν τῷ τῆς Ἀσίας Περίπλῳ - ἐν τοῖς Περίπλοις - ἐν τῷ Περὶ τῶν ἐν Σικελίᾳ θαυμαζομένων - πρὸς Ἀλέξανδρον Ἐπιστολή - Κάλλαισχρος - eius versus extemporanei - ἐν Ἀττικαῖς Λέξεσι - ἐν τοῖς περὶ Γλωσσῶν καὶ Ὀνομάτων - ἐν τοῖς περὶ Ὀνομάτων - Βοχχορηΐδος - ἐν τῷ ποιήματι - ἐν (τοῖς) Θαλασσίοις Ἔργοις - Ἡρακλείας - Ἡρ. - ἐν Ἡρακλείᾳ - ἐν ταῖς πρὸς Ἀλέξανδρον Ἐπιστολαῖς - ἐν τῇ πρὸς Ἀλ'. Ἐπιστολῇ - Κυνικῶν Συμπόσιον - ἐν πρώτῳ Μαγειρικῆς Διδασκαλίας - ἐν τῷ περὶ Διαλέκτου - Epigrammata - τῶν παρὰ τοῖς ἱστορικοῖς λέξεων - videtur igitur, Ὀψαρτυτικά scripsisse - ἐν τῇ Λακωνικῇ Πολιτείᾳ - Συμποτικοὶ Διάλογοι - ἐν τοῖς Συμποτικοῖς Ὑπομνήμασιν - περὶ Ποιητῶν - Πρυτάνεων Ἐρεσίων - ἐν τοῖς πρὸς τοὺς Σοφιστάς - ἐν τῷ Περὶ τῶν ἐν Σικελίᾳ τυράννων - ἐν τῷ ἐπιγραφομένῳ Τυράννων ἀναίρεσις ἐκ τιμωρίας - περὶ Φύτων - ἐν τοῖς περὶ Φύτων - ἐν τῷ περὶ Εὐδόξου - ἐν Ἀτθίδῳ - Ἀγαθοί - Ἄγριοι - Αὐτόμολοι - Γρᾶες - Γραφής - Δουλοδιδάσκαλος - Ἐπιλήσμων ἢ Θάλαττα - ἐν Ἐπιλήσμονι - Ἰπνὸς ἢ Παννυχίς - Κοριαννώ fabula - Κραπάταλλοι - Λῆροι - Μεταλλής - Φ. ἐν (τοῖς) Μεταλλεῦσι - Μυρμηκάνθρωποι - Φ. ἐν (τοῖς) Πέρσαις - Πετάλη - Τυραννίς - ὁ τὸν Χείρωνα πεποιηκὼς τὸν εἰς Φ. ἀναφερόμενον - εἰς ἣν ἀναφέρεται τὸ περὶ Ἀφροδισίων ἀκόλαστον σύγγραμμα - Ἀνανεουμένη - Ἁρπαζόμενος - Βαβυλώνιος - Μετιὼν ἢ Ζωμίον - ἐν Μετιόντι - Μοιχός - Νέαιρα - Παρεισιῶν - Πτωχή ἢ Ῥοδία - ἐν Πτωχῇ - ἐν τῷ ἐπιγραφομένῳ Σικελικῷ - Χήρα - ἐν τοῖς Ἀττικοῖς Ὀνόμασιν ἢ Γλώτταις - ἐν τῷ περὶ (τῶν) Ἀττικῶν Ὀνομάτων - ἐν ταῖς Ἀττικαῖς Φωναῖς - Παντοδαπῶν Χρηστηρίων - Ἀταλάντη - Κορινθιαστής - Κυναγίς - Κυνηγίς - Λαμπαδηφόροι - Οἰνοπίων - Φίλαυλος - carminum - ἐν (τοῖς) Ἀτάκτοις - ἐν τῇ Κροκωνιδῶν Διαδικασίᾳ - Ἀνανέωσις - Αὐλοί - Συμπλέουσαι - ἐν τῷ περὶ Καρῶν καὶ Λελέγων συγγράμματι - περὶ Αὐλητῶν - λόγον ἔγραψε κατὰ Σοφοκλέους - ἐν τῷ Μεταλλικῷ - ἐν τοῖς περὶ Μαντικῆς - ἐν τῇ ἐπιγραφομένῃ Τετραπόλει - Θετταλικῶν - ἐν τῷ περὶ τῶν ἐν Ῥόδῳ Σμινθείων - Κόθορνοι - περὶ τῶν ἐν Ἀσίᾳ Πόλεων - ἐν Δηλίῳ - ἐν τῷ περὶ τῶν Παραδόξων Ποταμῶν - Δεῖπνον - Ἄντεια fabula - Φρεώρυχος - Μισουμένη - Φύλαρχος - τῶν Ἰάμβων - Ἀπελεύθεροι fabula - Ἐφιάλτης - Κρόνος - Ποάστριαι - Τραγῳδοί - περὶ Τροφῆς - ἐν τοῖς περὶ Τροφῆς - ἐν Ὀλυμπιονίκαις - pyth. - nem. - ἐν τῷ πρὸς Ἱέρωνα Σκολίῳ - Σκόλιον in Xenophontem Corinthium - incerta - Αἱ ἀφ' ἱερῶν - Γρῦπες - Ἑορταί - Ζεὺς Κακούμενος - Κλεοφῶν - Λάιος - Μενέλεως - Νὺξ Μακρά - Πείσανδρος - Περιαλγής - Πρέσβεις - Σοφισταί - Σύρφαξ - Ὑπέρβολος - Φάων - Ἀλκιβιάδη - ὁ δεύτερος Ἀλκιβιάδης - ἐν τῷ περὶ Ἀνδρείας - Apologiae - ἐν τῷ Ἀτλαντικῷ - ἐν τῷ Γοργίᾳ - ἐν τῷ Εὐθυδήμῳ - Theaet. - Ἱππίας - ἐν τῷ Ἴωνι - † ἐν τῷ Κίμωνι - ἐν Κρατύλῳ - Κριτίας - Κρίτων - ἐν τῷ Κρίτωνι - Λάχης - ἐν τῷ Μενεξένῳ - ἐν (τῷ) Μένωνι - Νόμων - Parmenidis - ἐν (τῷ) Πρωταγόρᾳ - ἐν τῷ Τιμαίῳ - ἐν Φαίδρῳ - ἐν Φιλήβῳ - ἐν τῷ Χαρμίδῃ - ἐν τῷ περὶ ψυχῆς - quaest. symp. - τῶν πρὸς Ἀδαῖον καὶ Ἀντίγονον - περὶ τῆς Ἀθήνησιν Ἀκροπόλεως - ἐν τοῖς περὶ Ἀκροπ. - ἐν τοῖς πρὸς Ἀντίγονον περὶ Ζωγράφων - ἐν τῇ πρὸς Ἀράνθιον Ἐπιστολῇ - de Arto Messapiorum rege σύγγραμμα - ἐν τῇ πρὸς Ἄτταλον Ἐπιστολῇ - ἐν τῷ περὶ τοῦ Δίου Κῳδίου - ἐν τῷ Περὶ τῶν κατὰ πόλεις ἐπιγραμμάτων - ἐν τῷ περὶ Θαυμασίων - ἐν τῷ Περὶ τῶν ἐν Καρχηδόνι πέπλων - ἐν τῷ Περὶ τῶν ἐν Λακεδαίμονι ἀναθημάτων - ἐν τῷ περὶ (τοῦ) Μορύχου - ἐν ταῖς πρὸς τὸν Νεάνθην Ἀντιγραφαῖς - ἐν τῷ παρὰ Ξενοφῶντι Κανάθρῳ - ἐν τῇ περὶ Ὀνομάτων Ἀδόξων Ἐπιστολῇ - περὶ Παρασίτων - ἐν τῷ περὶ τῆς Ποικίλης Στοᾶς τῆς ἐν Σικυῶνι - ἐν τῷ περὶ τῶν ἐν Σικυῶνι πινάκων - ἐν τῷ περὶ

Σαμοθράκης - ἐν τῷ Περὶ τῶν ἐν Σικελίᾳ ποταμῶν - τῶν πρὸς Τιμαῖον - ἐν τοῖς πρὸς Τιμαῖον - περὶ Ἀφροδίτης - Λυκιακῶν - τὸ περὶ Ἀφροδισίων σύγγραμμα Philaenidi supposuit - ἐν τοῖς Λακωνικοῖς - Δημοτυνδάρεως - Μουσῶν Γοναί - ἐν τοῖς Ῥοδιακοῖς - Ἀποκλειομένη - Ἐφεσία - Λοκρίδες - Μεταφερόμενος - Χορεύουσαι - ἐν τῇ Αἰθιοπίδι - ἐν τῇ Ἀσωπίδι - Ἐπιγράμματα - ἐν τῇ Ἱστορίᾳ - Ἀμαζονίδος - Μαγνητικῶν - ἐν Δυμαίναις ἢ Καρυάτισιν - Ὑπόρχημα - eius scolia - ἐν Ἡμιάμβοις - ἐξηγούμενος τὴν κατὰ Διονύσιον (Thracem) διάταξιν (scil. poculi Nestorei) - Ἀκροάσεις Ἐρωτικαί - περὶ Δαφνικῶν Ἀγώνων - τῶν Κωμικῶν Ἱστοριῶν - Λακωνικῆς Πολιτείας - τῶν περὶ τὸν Φιλοπάτορα Ἱστοριῶν - ἐν ταῖς π. τ. Φ. Ἱστορίαις - Ὑπομνημάτων libri fuerunt XXIV - σύγγραμμα περὶ Ὀρχήσεως - Κρητικῶν Νομίμων - ἐν τῷ περὶ Αὐλητῶν - περὶ Αἰγίνης - ἐν τῷ περὶ τῆς Ἐρυθρᾶς Θαλάσσης - scol. - Ἀγὴν σατυρικὸν δραμάτιον - οἱ τὰ Γεωργικὰ συγγράψαντες ἀδελφοὶ - Histor. - Γέλως - ἐν τῷ Φιλίππου Βίῳ - ἐν τοῖς Βίοις - ἐν τοῖς περὶ Χαρακτήρων - ἐν πρώτῳ περὶ Εὑρημάτων - ἐν Μελεάγρῳ - ἐν τῇ ἐπιγραφομένῃ Ἱστορίᾳ - περὶ Ἑλληνισμοῦ - ἐν τῷ Ἁλιευτικῷ - Δηλιάδος - Νησιάδος - ἐν τῷ περὶ Παιάνων - Συνωνύμων - ἐν τοῖς Συνωνύμοις - ἐν τῇ Γοργοῖ - glossae - ἐν δευτέρῳ Ἰάμβων - ἐν Ἰάμβοις - ἐν Ἰάμβῳ - Castorionis - ἐν τοῖς Ποιήμασιν - Ἐμφυλίου Πολέμου - Ἐπικλήσεων - ἐν τῷ Περὶ ὅρων καὶ τόπων καὶ πυρὸς καὶ λίθων - διὰ τῶν Νόμων - Γαλάται - Εὐβουλοθεόμβροτος - Μυστάκου Θητίον - Νεκυία - Πύλαι - Σίλφαι - Φακῆ - Φυσιολόγος - ἔν τινι τῶν συγγραμμάτων - Ἀνδροκλῆς - Αἴας - Aiacis Locri - Αἰγεύς - Αἰθίοπες - Ἄμυχος σατυρικός - Ἀμφιάραος σατυρικός - Ἀνδρομέδα - Ἀντηνορίδαι - Ἀντιγόνη - Ἀχαιῶν Σύνδειπνον - Ἀχιλλέως Ἐρασταί - Ἑλένης Γάμος - Ἐπιταινάριοι - Ἔρις - Electrae - Θαμύρας - Ἴναχος - Ἰφιγένεια - Ἰχνευταί - Καμικοί - Κηδαλίων - Κολχίδες - Κρίσις - Λαρισαῖοι - Μάντεις? - Νιόβη - Οἰνόμαος - Ποιμένες - Σαλμωνεύς - Σκύθαι - Σύνδειπνον - Συνδείπνῳ - ἐν Συνδείπνοις - Τραχίνιαι - Τριπτόλεμος - Τυμπανισταί - Τυρώ - Φαίακες - ἐν (Μίμοις) Ἀνδρείοις - ἐν (Μίμοις) Γυναικείοις - ἐν Μίμοις - ἐν τῷ Ἀγροιώτῃ - ἐν τῷ Ὡλιεὺς τὸν ἀγροιώταν - ἐν τῷ μίμῳ Γυναῖκες αἳ τὰν θεὸν φαντὶ ἐξελᾶν - Θυννοθήρας - ἐν τῇ ἐπιγραφομένῃ Νυμφοπόνῳ - ἐν τῷ Παιδικὰ ποιφύξεις - ἐν τῇ Πενθερᾷ - περὶ Ἀλκμάνος - περὶ Βασιλείας - ἐν τοῖς Περὶ θυσιῶν - ἐν Ὁμοιότησιν - ἐν τῷ περὶ Χρόνων - Φιλοσόφων Διαδοχῆς - Κρητικῶν - Ἠοῖοι - Δαφνὶς ἢ Λιτυέρσας - ἐν τοῖς περὶ Ζῴων - Ἐγκλειόμεναι - Παραλυτρούμενος - ἐν τοῖς περὶ τῶν Τίμωνος Σίλλων - Ὁμοίων - ἐν τοῖς Ὁμοίοις - Τέχνη Ἐρωτική - Φιλολάκων - ἐν τοῖς Ἄθλοις - ἐν Γηρυονηίδι - ἐν Ἑλένῃ - Καλύκη - Ὀρεστεία - Παιδεία - ἐν Συοθήραις - ἐν τῷ περὶ Θεμιστοκλέους καὶ Θουκυδίδου καὶ Περικλέους - Ἀπομνημονεύματα - Γεωγραφικῶν - Γεωγραφουμένων - Φοινικίδης - Ἀνθρωπορέστης - Καλλιππίδης - Κινησίας - Λημνομέθα - Μακεδόνες ἢ Παυσανίας - ἐν Μακεδόσιν - ἐν Παυσανίᾳ - Παυσανίας - Ποτάμιοι - Τρωίλος - Χρύσιππος - Ψυχασταί - Σατυρικαὶ Κωμῳδίαι - Ἀμφικτύονες - Ἡσίοδοι - Πρυτάνεις - Στερροί - ἐν τῷ περὶ τοῦ Ἄστεος - ἐν Ἀργοῖ - ἐν τῷ Ἀσκληπιῷ - ἐν Ὑμεναίῳ διθυράμβῳ - ἐν τῷ περὶ Ἀφροδισίων - ὁ πρῶτος Γαστρολογίαν γράψας - ἐν τοῖς Ὁρισμοῖς - Ἄισματα - ὁ τὴν Θηβαίδα ποιήσας - ἐν Παλληνίδι - ἐν τῇ Χρυσῇ Βύβλῳ - ἐν Ἰθυφάλλοις - ἐν τῇ Βερενίκῃ - ἐν ταῖς Φαρμακευτρίαις - εἰς τὸν Ἔρωτα μέλος - ἐν Κενταύροις διθυράμβῳ - ἐν τινι ποιηματίῳ - ἐν (ταῖς) Ἀττικαῖς Γλώσσαις - ἐν τοῖς περὶ Ἀγώνων - Φάσμα ἢ Φιλάργυρος - Φιλοδέσποτος - ἐν ταῖς Ἐλεγείαις - Περὶ τῶν ἐν Ῥόδῳ θυσιῶν - ἐν τοῖς Βακχικοῖς Ἔπεσιν - Βοιωτία - Νεοπτόλεμος - Προιτίδες - Αἴτια

- ἐν τῷ πρὸς Κάσανδρον περὶ Βασιλείας - ἐν τῷ περὶ Γελοίου - ἐν τῷ περὶ τῶν Δακέτων καὶ Βλητικῶν - ἐν τῷ περὶ Ἐνθουσιασμοῦ - ἐν τῷ Ἐρωτικῷ - ἐν τῷ Περὶ ἑτεροφωνίας τῶν ὁμογενῶν - ἐν τῷ περὶ Εὐδαιμονίας - περὶ Ἠθῶν - περὶ Ἰχθύων? - ἐν τῷ περὶ Κολακείας - ἐν τῷ περὶ Κωμῳδίας - ἐν τῷ Περὶ τῶν μεταβαλλόντων τὰς χρόας - ἐν τῷ Περὶ τῶν ἐν τῷ ξηρῷ διαιτωμένων - ἐν τῷ περὶ Ὀδμῶν - ἐν τῷ Περὶ τῶν κατὰ τόπους διαφορῶν - ἐν τῷ περὶ Πνιγμοῦ - ἐν Φυτικοῖς Αἰτίοις - τῶν Αἰτίων - Φυτικῶν Αἰτίων - τῆς (περὶ) Φύτων Ἱστορίας - ἐν τῷ περὶ Φύτων Ἱστορίας - ἐν τῷ περὶ (τῶν) Φωλευόντων - Ἄδμητος - Ἀλθαία - Ἀφροδίτη - Ἡδυχάρης - Μῆδος - Νεμέα - Πηνελόπη - Στρατιώτιδες - Φιλιππικῶν s. Ἱστοριῶν s. Φιλιππικῶν Ἱστοριῶν - ἐν ταῖς πρὸς Ἀλέξανδρον Συμβουλαῖς - ἐν τοῖς περὶ τῆς Χίας Ἐπιστολῆς - ἐν τῷ Περὶ τῶν ἐκ Δελφῶν συληθέντων χρημάτων - ἐν τῷ Κατὰ τῆς Πλάτωνος διατριβῆς - ἐν τῷ ἐπιγραφομένῳ Ἁρματίῳ - ἐν τινι τῶν Προοιμίων - ἐν τῷ εἰς Εὐριπίδην Ἐπιγράμματι - Δεῖπνον δι᾽ ἐπῶν ἐν ἕνδεκα βιβλίοις ἢ καὶ πλείοσι - Δείπνων - τοῦ Δείπνου - ἐν τοῖς Δείπνοις - ἐν ταῖς πρὸς αὐτὸν Ἀντιγραφαῖς - ἐν τετάρτῳ περὶ τοῦ Ἐρατοσθένους Ἑρμοῦ - Σίλλων - ἐν τοῖς Σίλλοις - κατὰ τὸν Τίμωνος Πρόδικον - Ἰνδαλμάτων? - Αἰγύπτιοι - Δῆλος - Δημοσάτυροι - Διονυσιάζουσαι - Δρακόντιον - Ἐπιστολαί - Ἐπιχαιρέκακος - Ἰκάριοι Σάτυροι - Ἰκάριοι - Καύνιοι - Κένταυρος ἢ Δεξάμενός - Κονίσαλος - Λήθη - Μαραθώνιοι - Ὀρεσταυτοκλείδης - Πορφύρα - Πύκτης - Φιλοδικαστής - Ψευδολσται - περὶ Σφαιριστικῆς - ἐν τοῖς Κυπριακοῖς - Κυνάριον - ἐν Κύκλωπι - Ναυτίλος carmen a Dorione irrisum - Ὠδίς - ἐν τοῖς τοῦ Βασιλέως Νόμοις - ἐν τοῖς κύρβεσι τοῖς περὶ τῶν Δηλιαστῶν - ἐν τοῖς Δημοπράτοις - στήλη ἐν Ἀκροπόλει, ἢ τὰ ἀναθήματα περιέχει - στήλη ἐν τῷ Ἀνακείῳ - ψηφίσματα - ἐν Ἀττικῇ Προσῳδίᾳ - ἐν τοῖς περὶ Σώων - (περὶ) Ὀνομασιῶν - ἐν τοῖς Ὀνοματικοῖς - Φυτικῶν - Φύτων Ἱστορίας - ἐν τοῖς Φυτικοῖς - Τὸ ἐπὶ τῇ φακῇ μύρον - τῶν Λυδιακῶν - ἐν τοῖς Λυδιακοῖς - Βουκολίων - Πένταθλος - Πρίαπος - ἐν Παρῳδίαις - ἐν Ἀγησιλάῳ - Ἀλκιβιάδης - Ἀναβάσεως - Ἀπομνημευμάτων - ἐν (τοῖς) Ἀπομνημονεύμασιν - ἐν τῷ Ἱέρωνι ἢ Τυραννικῷ - ἐν (τῷ) Ἱέρωνι - ἐν τῷ περὶ Ἱππικῆς - ἐν Κυνηγετικῷ - Κύρου Παιδεία - ἐν Οἰκονομικῷ - Παιδείας - ἐν τῷ περὶ Πόρων - ἐν τῷ περὶ τῆς πατρίδος συγγράμματι - Ἀπομνημοεύματα - Ἐπιτομῶν - Ἱστορικὰ Ὑπομνήματα - ad Hom. - ἐν τῷ Συγγενικῷ - popularium carminum - Sotadeus versiculus.

As already explained for the index of Meineke at p. 344, also Kaibel makes an effort to preserve the original Greek forms of work titles cited by Athenaeus. These forms are represented in the database of the *Digital Athenaeus*, but there are many occurrences where information about book numbers and internal divisions of works has been extracted and stored in the database field Sub Work.[90]

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90 For example, the expression ἐν τετάρτῳ περὶ Ποιημάτων in the entry of DEMETRIVS ὁ Βυζάντιος at p. 603 of the index has been split into ἐν τετάρτῳ (Sub Work) and περὶ Ποιημάτων (Work).

Finally, the following 136 unique expressions are used by Kaibel to characterize authors in his index:[91]

adespota (1) - *alibi ὁ γλωσσογράφος* (1) - *comici* (3) - *comicus* (98) - *comoediae poetae* (1) - *comoediae veteris poeta* (1) - *cynicus* (2) - *Dieuchis medici discipulus* (1) - *Duridis frater, Theophrasti discipulus* (1) - *elegi* (1) - *Epicureus* (1) - *generis incerti poetae* (1) - *grammatica* (1) - *grammaticus* (20) - *grammaticus?* (3) - *griphi* (1) - *Hadrianae aetatis poeta* (1) - *hexametri* (1) - *hilarodus* (1) - *iambi* (1) - *iambographi* (1) - *iambographus* (1) - *inter Halieuticorum scriptores* (1) - *Iulii Caesaris legatus* (1) - *lyricus* (1) - *Machonis discipulus* (1) - *medicus* (4) - *medicus poeta* (1) - *medicus?* (3) - *melici* (1) - *melicus poeta* (1) - *minor, comicus* (1) - *musicus* (1) - *orator* (7) - *parodi* (1) - *parodiarum scriptor* (1) - *philosophus* (2) - *poeta* (5) - *(poeta)* (1) - *poeta epicus* (1) - *poeta ignotus* (1) - *sophista* (1) - *stoicus* (1) - *tragici* (1) - *tragicus* (10) - *tragicus poeta* (1) - *ἀπὸ τῆς νέας Ἀκαδημίας* (1) - *Ἀριστοτέλους μαθητής; ὁ Ἀριστοτελικός* (1) - *ἐλεγειοποιός* (1) - *ἐποποιός* (1) - *ἡ μελοποιός* (1) - *ἰαμβοποιός* (2) - *Ἰάμβων ποιήτρια* (1) - *ἰατρός* (1) - *ἱλαρῶν ᾀσμάτων ποιητής* (1) - *Καλλιμάχου γνώριμος* (1) - *μουσικός* (1) - *ὁ Ἀκαδημαικός* (2) - *ὁ Ἀλεξάνδρου βηματιστής* (1) - *ὁ ἀπὸ τῆς στοᾶς* (3) - *ὁ ἀπὸ τοῦ περιπάτου, τῶν Ἀριστοτέλους μαθητῶν οὐδενὸς δεύτερος* (1) - *ὁ ἀριθμητικός* (1) - *ὁ Ἀριστοτέλους γνώριμος* (1) - *ὁ Ἀριστοτέλους μαθητής* (1) - *ὁ Ἀριστοφάνειος* (3) - *ὁ ἁρμονικός* (1) - *ὁ αὐλητής* (1) - *ὁ βασιλεύς* (1) - *ὁ γλωσσογράφος* (1) - *ὁ γραμματικός* (2) - *ὁ δεύτερος Εὐεργέτης* (1) - *ὁ διαλεκτικός* (2) - *ὁ διθυραμβοποιός* (2) - *ὁ ἐμὸς συγγραφεύς* (1) - *ὁ ἐξ Ἀκαδημίας* (1) - *ὁ ἐπικαλούμενος Ἴαμβος* (1) - *ὁ ἐποποιός* (5) - *ὁ Ἐρασιστράτειος* (2) - *ὁ ζωγράφος* (1) - *ὁ Ἡροφίλειος* (1) - *ὁ ἰαμβοποιός* (2) - *ὁ ἰατρός* (6) - *ὁ Ἰσοκράτους μαθητής* (2) - *ὁ ἱστοριογράφος* (1) - *ὁ Καλλιμάχειος* (2) - *ὁ Κρατήτειος* (1) - *ὁ κριτικός* (1) - *ὁ κυνικός* (3) - *ὁ κωμικός* (1) - *ὁ κωμῳδιοποιός* (1) - *ὁ λογοποιὸς ἢ ἄλλος τις* (1) - *ὁ Μαυρουσίων βασιλεύς* (1) - *ὁ μελοποιός* (2) - *ὁ μηχανικός* (1) - *ὁ μουσικός* (2) - *ὁ νεώτερος* (2) - *ὁ νομοθέτης* (1) - *ὁ παρῳδός* (1) - *ὁ περιηγητής* (2) - *ὁ περιπατητικός* (3) - *ὁ περιπατητικός, Ἀριστοτέλους μαθητής* (2) - *ὁ περιπατητικός, ὁ Ἀριστοτέλους μαθητής* (1) - *ὁ ποιητής* (3) - *ὁ Πυθαγορικός* (3) - *ὁ Πυρρώνειος* (1) - *ὁ ῥήτωρ* (4) - *ὁ ῥήτωρ ὁ ἀπὸ Καλῆς ἀκτῆς* (1) - *ὁ ῥυθμικός* (1) - *ὁ Ῥωμαίων στρατηγός* (1) - *ὁ σοφιστής* (2) - *ὁ σοφὸς πεμματολόγος* (1) - *ὁ συγγραφεύς* (1) - *ὁ Σωκρατικός* (3) - *ὁ Σωτάδου* (1) - *ὁ τὰ Περσικὰ συγγράψας* (1) - *ὁ τῆς ἀρχαίας κωμῳδίας ποιητής* (1) - *ὁ τῆς τραγῳδίας ποιητής* (1) - *ὁ τοῦ Ἀρείου* (1) - *ὁ τοὺς εἰς Χιωνίδην ἀναφερομένους ποιήσας Πτωχούς* (1) - *ὁ τραγικός* (1) - *ὁ τραγιχὸς ποιητής* (1) - *ὁ τραγῳδοδιδάσκαλος* (1) - *ὁ Τρύφωνος* (1) - *ὁ τύραννος* (2) - *ὁ τῶν κωμῳδιῶν ποιητής* (1) - *ὁ τῶν ποιητῶν βασιλεύς* (1) - *ὁ φιλόσοφος* (2) - *ὁ φλυακογράφος, ὁ παρῳδός* (1) - *ὁ φυσικός* (1) - *οὐχ ὁ Μαρωνείτης ἀλλ' ὁ τῆς μέσης κωμῳδίας* (1) - *παρῳδιῶν ποιητὴς ἐνδοξότατος, σῴζεται αὐτοῦ τῶν Παρῳδιῶν βιβλία τέσσαρα* (1) - *ποιητής* (2) - *ποιητὴς μοχθηρῶν νόμων* (1) - *ῥήτωρ* (3) - *συγγραφεύς* (1) - *τῆς Ἰταλικῆς καλουμένης κωμῳδίας ποιητής* (1).

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91 This data is extracted from the database field `Characterization` of the digital version of the *Index Scriptorum* of Meineke and is arranged in alphabetical order by language. Numbers in round brackets refer to the total number of occurrences in the field `Characterization` with a distinction by *name* and *ethnicon*.

5.5.3 Kaibel – Dialogi Personae

The Teubner edition of the *Deipnosophists* of Georg Kaibel includes also an index entitled *Dialogi Personae*, where the editor collects references to the following twenty-four *deipnosophistai* and a group of anonymi who participate in the dialogues described by Athenaeus:[92] Aemilianus Maurus, Alcides Alexandrinus, Amoebeus, Arrianus, Athenaeus Naucratita, Cynulcus, Daphnus Ephesius, Democritus Nicomedensis, Dionysocles, Galenus Pergamenus, Larensis, Leonidas Eleus, Magnus (*fortasse Romanus genere*), Masurius, Myrtilus Thessalus, Palamedes ὁ Ἐλεατικός, Philadelphus Ptolemaeensis, Plutarchus Alexandrinus, Pontianus Nicomedensis, Rufinus Nicaeensis, Timocrati Athenaeus amicus, Ulpianus Tyrius, Varus, Zoilus, and Anonymi.

The digital version of this index has been created with the same method used for the *indices scriptorum* of Meineke and Kaibel starting from the OCR output of the printed edition.[93] Also in this case each entry is embedded in a TEI XML element `<p>`.[94] Each entry has been structured in order to generate an SQL database that can be queried with the following search fields that are accessible through the *Index Digger*:[95]

- `Name 1`: character name (e.g., VLPIANVS);
- `Name 2`: second character name, when applicable (e.g., Maurus);
- `Ethnicon`: place of origin of a character (e.g., Alexandrinus);
- `Characterization`: literary genre or profession of a character (e.g., medicus);
- `Note`: Kaibel notes to name, ethnicon and/or characterization fields (e.g., graece Λαρήνσιος s. Λαρίνσιος ...);
- `Speech`: references to when and how characters speak in the *Deipnosophists* (e.g., loquitur);
- `Athenaeus Book`: book numbers of the *Deipnosophists* for each occurrence (e.g., Book 12);
- `Casaubon Reference`: references to passages in the *Deipnosophists* where characters are cited (e.g., 3.83c);

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92 Kaibel (1887–1890), vol. III 561–564. Entries are here reproduced as in the index of Kaibel. The *deipnosophistai* are twenty-two with the addition of the narrator Athenaeus and his interlocutor Timocrates. On the structure of the *Deipnosophists* and its characters, see Wilkins (2000). The edition of Kaibel prints also an *Index Nominum* (677–780) and an *Index Glossarum* (781–810).

93 The digital version of the *Dialogie Personae* is available at http://digitalathenaeus.org/tools/KaibelDialogiPersonae/. The printed version is openly available at https://archive.org/stream/athenaeinavcrati03atheuoft#page/561/mode/1up (*Dialogi Personae* p. 561).

94 The XML output is available at https://github.com/OpenGreekAndLatin/athenaeus-dev/blob/master/athenaeusKaibel_3.xml.

95 http://digitalathenaeus.org/tools/KaibelDialogiPersonae/digger.php

- `Kaibel Reference`: conversion of Casaubon references into Kaibel references (e.g., 3.25);
- `Note (Reference)`: Kaibel notes to Casaubon references (e.g., cf. praef. I vi).

Additional output fields are the same of the other indices, ambiguous correspondeces between Casaubon sections and Kaibel paragraphs can be voted and disambiguated, and reference ranges are represented like in the *indices scriptorum* of Meineke and Kaibel (see pp. 324 ff.). The following are examples of combined search results: `Name 1` (VLPIANVS) AND `Speech` (loquitur); `Name 1` (ANONYMI) AND `Athenaeus Book` (Book 14); `Characterization` (grammaticus) OR `Characterization` (medicus) (fig. 5.15).

#	Name 1	Name 2	Ethnicon	Characterization	Note	Speech	Athenaeus Book	Casaubon Reference	Kaibel Reference	Vote	Note (Reference)	Read Greek Text (Perseus)	Read Greek Text (FrontEnd UniLeipzig)	Annotate with Perseis
1	AEMILIANVS	Maurus		grammaticus			1	1.1c	1.1 [0 - 0%] 1.2 [1 - 100%]	Vote	cf. praef. I p. vi	1.1 1.2	1.1 - 1.2	1.1 - 1.2
124	ARRIANVS			grammaticus			3	3.113a	3.79			3.79	3.79	3.79
348	DAPHNVS		Ephestus	medicus			1	1.1e	1.2		cf. praef. I p. vi	1.2	1.2	1.2
782	DIONYSOCLES			medicus		loquitur	3	3.96d	3.50		cf. adn. c. 88 in.	3.50	3.50	3.50
783	DIONYSOCLES			medicus		loquitur	3	3.116d	3.84		cf. adn. c. 88 in.	3.84	3.84	3.84
784	DIONYSOCLES			medicus		loquitur	3	3.116e	3.84 3.85	Vote	cf. adn. c. 88 in.	3.84 3.85	3.84 - 3.85	3.84 - 3.85
785	DIONYSOCLES			medicus		loquitur	3	3.116f	3.85		cf. adn. c. 88 in.	3.85	3.85	3.85
786	GALENVS		Pergamenus	medicus			1	1.1e	1.2		cf. praef. I p. vi	1.2	1.2	1.2
937	LEONIDAS		Eleus	grammaticus			1	1.1c	1.1 1.2	Vote		1.1 1.2	1.1 - 1.2	1.1 - 1.2
1427	MYRTILVS			grammaticus	γραμματικώτατε appellatur		13	13.570b	13.25 13.26	Vote		13.25 13.26	13.25 - 13.26	13.25 - 13.26
1700	PLVTARCHVS			grammaticus			1	1.1c	1.1 1.2	Vote	cf. praef. I p. vi	1.1 1.2	1.1 - 1.2	1.1 - 1.2
2354	RVFINVS		Nicaeensis	medicus			1	1.1f	1.2 1.3	Vote	cf. praef. I. p. vi	1.2 1.3	1.2 - 1.3	1.2 - 1.3
2680	VARVS			grammaticus		loquitur	3	3.118d	3.87 3.88	Vote		3.87 3.88	3.87 - 3.88	3.87 - 3.88
2681	VARVS			grammaticus		loquitur	3	3.118e	3.88			3.88	3.88	3.88
2682	ZOILVS			grammaticus			1	1.1d	1.2			1.2	1.2	1.2

Figure 5.15. Kaibel, *Dialogi Personae*: *grammaticus* or *medicus*

Also the *Dialogi Personae* has a *Dynamic Graph* where results can be obtained by filtering data using the following filter fields:[96]

- `Name 1`: character name (e.g., VLPIANVS);
- `Name 2`: second character name, when applicable (e.g., Maurus);
- `Ethnicon`: place of origin of a character (e.g., Alexandrinus);
- `Characterization`: literary genre or profession of a character (e.g., medicus);
- `Speech`: references to when and how characters speak in the *Deipnosophists* (e.g., loquitur).

96 http://digitalathenaeus.org/tools/KaibelDialogiPersonae/dynamic_graph.php
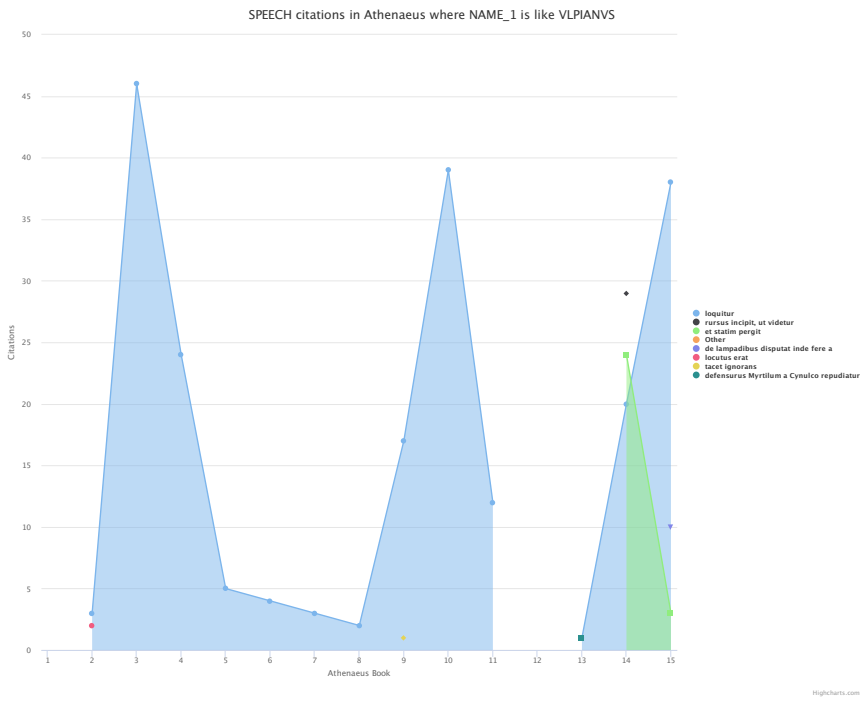
Figure 5.16. *Dynamic Graph* (Kaibel, *Dialogi Personae*): Ulpianus

The following are examples of filtered search results with their corresponding links to the *Dynamic Graph*: `Speech` + `Name 1` (VLPIANVS) (fig. 5.16); `Name 1` + `Ethnicon` (Alexandrinus). Also in this case results of the *Dynamic Graph* are visualized through *Highcharts*, can be printed, and can be downloaded as PNG image, JPEG image, PDF document and SVG vector image. It is also possible to hide/show graphs by selecting/deselecting entries in the list at the right of the chart, and visualize the number of occurrences in each book of the *Deipnosophists* by hovering the mouse over the selected book.[97]

The *Digital Athenaeus* project provides scholars with a *Web API* with a JSON output of *Index Digger* queries of the *Dialogi Personae* of Kaibel:[98]

`api.php?what=<search string>&where=<search field>&exact=[yes:no]`

Search fields of the Web API can be one of the following: `name_1`, `name_2`, `ethnicon`, `characterization`, `note`, `speech`, `book`, `casaubon_reference`, `kaibel_reference`, `note_reference`. For example, if we want to know when Athenaeus refers to himself in the *Deipnosophists*, we get the following result:[99]

```
[
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "Naucratita",
        "Characterization": "",
        "Note": "",
        "Speech": "",
        "Book": "3",
        "Casaubon_Reference": "3.73a",
        "Kaibel_Reference": "3.2",
        "Note_Reference": "",
        "Is_Range": ""
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "ὁ τῆς βίβλου πατήρ",
        "Note": "",
        "Speech": "",
        "Book": "1",
        "Casaubon_Reference": "1.1a",
        "Kaibel_Reference": "1.1",
        "Note_Reference": "",
```

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97   Cf. fig. 5.12 for the *Index Scriptorum* of Meineke.
98   http://digitalathenaeus.org/tools/KaibelDialogiPersonae/api.php
99   http://digitalathenaeus.org/tools/KaibelDialogiPersonae/api.php?what=ATHENAEVS&w here=Name_1&exact=no

```
        "Is_Range": ""
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "libri argumenta",
        "Note": "",
        "Speech": "",
        "Book": "1",
        "Casaubon_Reference": "1.1a",
        "Kaibel_Reference": "1.1",
        "Note_Reference": "",
        "Is_Range": "range start"
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "libri argumenta",
        "Note": "",
        "Speech": "",
        "Book": "1",
        "Casaubon_Reference": "1.1b",
        "Kaibel_Reference": "1.1",
        "Note_Reference": "",
        "Is_Range": "range"
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "libri argumenta",
        "Note": "",
        "Speech": "",
        "Book": "1",
        "Casaubon_Reference": "1.1c",
        "Kaibel_Reference": "1.1 and/or 1.2",
        "Note_Reference": "",
        "Is_Range": "range"
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "libri argumenta",
        "Note": "",
        "Speech": "",
        "Book": "1",
```

```
        "Casaubon_Reference": "1.1d",
        "Kaibel_Reference": "1.2",
        "Note_Reference": "",
        "Is_Range": "range"
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "libri argumenta",
        "Note": "",
        "Speech": "",
        "Book": "1",
        "Casaubon_Reference": "1.1e",
        "Kaibel_Reference": "1.2",
        "Note_Reference": "",
        "Is_Range": "range"
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "libri argumenta",
        "Note": "",
        "Speech": "",
        "Book": "1",
        "Casaubon_Reference": "1.1f",
        "Kaibel_Reference": "1.2 and/or 1.3",
        "Note_Reference": "",
        "Is_Range": "range end"
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "libri forma",
        "Note": "",
        "Speech": "",
        "Book": "1",
        "Casaubon_Reference": "1.2a",
        "Kaibel_Reference": "1.3",
        "Note_Reference": "ipse Timocrati enarrat dipnosophistarum
 sermones, v. TIMOCRATES",
        "Is_Range": ""
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
```

```
        "Characterization": "eius liber de Syriae regibus",
        "Note": "",
        "Speech": "",
        "Book": "5",
        "Casaubon_Reference": "5.211a",
        "Kaibel_Reference": "5.47",
        "Note_Reference": "",
        "Is_Range": "range start"
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "eius liber de Syriae regibus",
        "Note": "",
        "Speech": "",
        "Book": "5",
        "Casaubon_Reference": "5.211b",
        "Kaibel_Reference": "5.47",
        "Note_Reference": "",
        "Is_Range": "range"
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "eius liber de Syriae regibus",
        "Note": "",
        "Speech": "",
        "Book": "5",
        "Casaubon_Reference": "5.211c",
        "Kaibel_Reference": "5.47",
        "Note_Reference": "",
        "Is_Range": "range"
    },
    {
        "Name_1": "ATHENAEVS",
        "Name_2": "",
        "Ethnicon": "",
        "Characterization": "eius liber de Syriae regibus",
        "Note": "",
        "Speech": "",
        "Book": "5",
        "Casaubon_Reference": "5.211d",
        "Kaibel_Reference": "5.47",
        "Note_Reference": "",
        "Is_Range": "range end"
    }
]
```

The *Dialogie Personae* of Kaibel includes the following 55 unique expressions to characterize the *deipnosophistai*:[100]

alii (1) - *appellatur ὁ Ῥωμαίων μεγαλοσοφιστής* (1) - *apud Corinthios publice declamarat* (1) - *cognomine Βλεψίας* (1) - *cognomine Κειτούκειτος* (1) - *cynicus* (1) - *eius bibliotheca* (1) - *eius liber de Syriae regibus* (1) - *eius mores et ingenium* (1) - *eius mores ingenium doctrina* (1) - *eius προπάτωρ dicitur* (propter studiorum μεταχειρίζεσθαι cf. Dessau 1. s) Varro Menippeus (1) - *grammaticus* (7) - *helluo et lascivus saepius notatur velut* (1) - *Homeri carminum diligentissimus* (1) - *iter fecerat ἐκ Συννάδων εἰς Μητρόπολιν ἀφικνούμενος* (1) - *iure consultus, iamborum poeta, musicus* (1) - *libatione facta et paeane recitato dimittit convivas* (1) - *libri argumenta* (1) - *libri forma* (1) - *medicus* (4) - *musicus* (1) - *nomen e Parmenisci symposio petitum videtur* (1) - *pater eius κρηπιδοποιός* (1) - *patria incerta, nam quod dicit κατὰ τὸν ἐμὸν Μεγαλοπολίτην Κερκιδᾶν non Megalopolitanum se esse significat sed cynicum; cynicus enim Cercidas fuit, ut docent versuum reliquiae* (1) - *philosophus* (3) - *placidam mortem obiit* (1) - *procurator prov. Moesiae* (1) - *senex est* (1) - *significatur obscurius ὁ † Νιττούνιος ἡμῶν* (1) - *stoici aderant* (1) - *Ulpiano inimicus* (1) - *Ulpiano ἀεὶ ἀντικορυσσόμενος* (1) - *utriusque linguae peritus indeque Ἀστεροπαῖος vocatus* (1) - *verum nomen Theodorus* (1) - *verum nomen Theodorus, quod ipse celare solet* (1) - *Ἐπικούρειός τις εἰκαδιστὴς τῶν συνδειπνούντων* (1) - *καθεσταμένος ἐπὶ τῶν ἱερῶν εἶναι καὶ θυσιῶν ὑπὸ τοῦ πάντα ἀρίστου βασιλέως Μάρκου καὶ μὴ ἔλαττον τῶν πατρίων τὰ τῶν Ἑλλήνων μεταχειρίζεσθαι* (1) - *κύον ἀδδεές appellatur ab Ulpiano* (1) - *λογιστής* (1) - *μουσικῆς ἐραστής* (1) - *μουσικώτατον appellat Cynulcus* (1) - *ὁ καθ' ἡμᾶς κιθαρῳδός, comparatur cum Amoebeo antiquo citharoedo* (1) - *ὁ λαμπρὸς s. καλὸς ἡμῶν ἑστιάτωρ* (1) - *ὁ μάγειρος, qui Σόφων nomine e comoedia petito appellatur* (1) - *ὁ ὀνοματολόγος* (1) - *ὁ τῆς βίβλου πατήρ* (1) - *ὁ τῶν δείπνων ταμίας* (1) - *ὁ φιλεπιτιμητής* (1) - *τῶν γραμματικῶν τις* (1) - *τῶν κυνικῶν τις* (1) - *τῶν παρασίτων καὶ κολάκων τις* (1) - *τῶν παρόντων ἰατρῶν τις* (1) - *τῶν σοφιστῶν μαγείρων* (1) - *φιλόσοφοι οἱ παρόντες* (1) - *Φοῖνιξ ἄττα γεραιέ appellatur* (1).

These expressions have of course to be understood in connection with each entry of the *Dialogi Personae* of Kaibel, but nevertheless they reveal the complexity of the references to the protagonists of the dialogues of the *Deipnosophists* and the deep level of interpretation and *annotation* by Kaibel.

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100 This data has been extracted from the database field `Characterization` of the digital version of the *Dialogi Personae* of Kaibel and is arranged in alphabetical order by language. Numbers in round brackets refer to the total number of unique occurrences in the field `Characterization` with a distinction by *name* and *ethnicon*.

5.5.4 Olson – Index of Authors, Texts, and Persons

The last index which is available in the *Digital Athenaeus* project is the *Index of Authors, Texts, and Persons* published by Douglas S. Olson in the last volume of his Loed edition of the *Deipnosophists*.[101] This index is not a selection of authors and works cited by Athenaeus, but a list that includes also other persons mentioned in the text, as explained by Olson himself.[102] The reference to the online *Thesaurus Linguae Graecae* (TLG) and the possibility of searching ancient Greek words in text of the *Deipnosophists* is certainly true, but this assertion reveals a traditional perspective with an interest in single occurrences. The same consideration is also valid for names of authors and titles/descriptions of works.

The value of the *indices scriptorum* of August Meineke and Georg Kaibel is due to the efforts made by these editors to extract and disambiguate information pertaining to the citations preserved by Athenaeus.[103] As we will see in the

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101 Olson (2006–2012), vol. VIII 220–360. The digital version of the index is available at http://www.digitalathenaeus.org/tools/OlsonIndex/.

102 Olson (2006–2012) 219: "This index supersedes those at the end of the first seven individual volumes of the new Loeb Athenaeus, which were prepared by different research assistants working under my supervision, and which accordingly vary somewhat in format, coverage, citation style, and the like. Almost every personal name in the index is followed by a brief identifier. Individuals of primarily historical rather than literary interest are further identified, where possible, by reference to one or more of the relevant standard prosopographies. In the case of obscure homonyms, I have generally chosen to split rather than to combine entries, although absolute consistency in this matter — as in many others — is impossible. Fragmentary authors and texts are identified by the modern editor or editors on whose numbering I have relied; for clarity's sake, I have attempted to follow the individual preferences of such editors in the use of the designations fr., F, and the like. Occasional parentheses around numbers indicate that while the editor of the standard edition of the author or work in question regards this as a legitimate fragment or testimonium, I do not. Lowercase Roman numerals at the beginning of entries refer to page numbers in the introduction in Volume 1 (LCL 204). Gulick included a separate index of Greek words in the final volume of his Loeb. The ongoing development of digital search tools has made a printed — and thus inevitably selective — Greek index less necessary or useful than one might have been in his day. I have accordingly chosen instead to catalog material less easily accessible via a simple TLG search or the like." Olson has published also an *Index of Places and People* (ibid. 361–380: "This index includes commodities, flora and fauna, dialects, measures, and the like associated with individual cities, regions, or peoples named in the text. It does not include geographical terms used primarily as identifiers for individuals. Thus, for example, Philip of Macedon is not included here under 'Macedon.' Nor does this index include geographical or ethnic terms that are merely part of the titles of literary works (e.g., Aristophanes' *Lemnian Women* and Crates' *Attic Dialect*).")

103 Meineke and Kaibel produced also an *Index Rerum* (in Latin), an *Index Nominum* (in ancient Greek), and an *Index Glossarum* (in ancient Greek) in their editions: see pp. 322, 369, and 370. Charles Gulick, who is referred to by Olson, published a *Greek Index* and an *English Index*: see Gulick (1951–1957), vol. VII 277–327 and 329–345. Cf. also ibid. x: "In the Indixes, prepared with the devoted aid of my wife, effort has been made to show as completely as possible the vast scope and encyclopaedic nature of Athenaeus' work."

following sections and in particular in the discussion about Named Entity Recognition, this is the reason why the work of Meineke and Kaibel is more useful than the index of Olson in order to provide data for generating a catalog of ancient Greek authors and works in the original language.[104]

The index of Olson is now readable as part of the *Digital Loeb Classical Library*, which is accessible with a subscription.[105] This resource allows users to consult the index on the screen, but is not dynamic and doesn't connect index entries with the text of the *Deipnosophists* and other tools. The *Digital Athenaeus* project offers an expanded and dynamic version of the index of Olson that has been generated from the HTML version of it. The output has been structured in an SQL database that can be queried with the following search fields that are accessible through the *Index Digger*:[106]

- `Name`: author/person/god name (e.g., Achaeus of Eretria);
- `Identifier`: literary genre, profession, or characterization of authors and persons (e.g., philosopher);
- `Sub Identifier`: further characterization of authors, persons, and gods (e.g., as Mother of the Gods);
- `Prosopographical Reference`: references to prosopographies (e.g., PAA);[107]
- `Prosopographical Reference ID`: prosopography identifiers for authors and persons (e.g., 101398);
- `Work`: abbreviation of work titles (e.g., PV);
- `Edition`: references to modern editions and collections (e.g., FGrH);[108]
- `Edition ID`: edition and collection identifiers for authors and work passages (e.g., 488);
- `Passage`: work passages cited and quoted in the *Deipnosophists* (e.g., T 1);
- `Athenaeus Book`: book numbers of the *Deipnosophists* for each occurrence (e.g., Book 7);
- `Casaubon Reference`: references to passages in the *Deipnosophists* where authors, persons, and texts are cited (e.g., 1.17d);
- `Kaibel Reference`: conversion of Casaubon references into Kaibel references (e.g., 1.30).

Additional output fields are the same of the other indices, ambiguous correspondences between Casaubon sections and Kaibel paragraphs can be voted and disambiguated, and reference ranges are represented like in the *indices scriptorum*

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104 Also the indices of "names", "things", and "glossae" produced by Meineke and Kaibel (see n. 103) are useful as disambiguated lists of entries and lemmata than can be used to perform NLP analyses of the text of the *Deipnosophists*.

105 See https://www.loebclassics.com/view/LCL519/2012/pb_LCL519.219.xml (pp. 220–221). On the *Digital Loeb Classical Library*, see p. 47.

106 http://www.digitalathenaeus.org/tools/OlsonIndex/digger.php

107 Olson refers to a total of 11 prosopographical resources in his index.

108 Olson refers to a total of 117 editions in his index.

of Meineke and Kaibel.[109] The following are examples of combined search results: `Name` (Aristophanes) AND `Edition` (Kassel-Austin eds.); `Identifier` (historian) AND `Athenaeus Book` (Book 7); `Name` (Aeschylus of Alexandria) OR `Name` (Aeschylus of Athens).
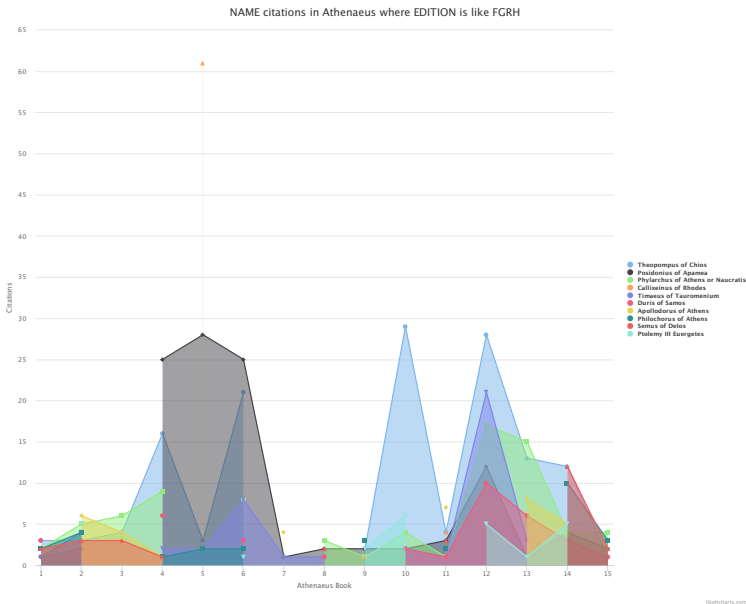

Figure 5.17. *Dynamic Graph* (Olson, *Index of Authors, Texts, and Persons*): FGrH

Also the *Index of Authors, Texts, and Persons* has a *Dynamic Graph* where results can be obtained by filtering data using the following filter fields:[110]

- `Name`: author/person/god name (e.g., Achaeus of Eretria);
- `Identifier`: literary genre, profession, or characterization of authors and persons (e.g., philosopher);
- `Sub Identifier`: further characterization of authors, persons, and gods (e.g., as Mother of the Gods);
- `Prosopographical Reference`: references to prosopographies (e.g., PAA);
- `Prosopographical Reference ID`: prosopography identifiers for authors and persons (e.g., 101398);
- `Work`: abbreviation of work titles (e.g., PV);

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109 See pp. 324 ff. The *Index Digger* of the index of Olson provides a further output field, which is called `Note Reference` and visualizes Olson notes to Casaubon references (constituted only by the forms *note*, *round brackets* to refer to the use of () by Olson to embed references, and *with note*).

110 http://digitalathenaeus.org/tools/OlsonIndex/dynamic_graph.php

- `Edition`: references to modern editions and collections (e.g., FGrH);
- `Edition ID`: edition and collection identifiers for authors and work passages (e.g., 488);
- `Passage`: work passages cited and quoted in the *Deipnosophists* (e.g., 1.225).

The following are examples of filtered search results with their corresponding links to the *Dynamic Graph*: `Name` + `Edition` (FGrH); `Name` + `Edition` (FGrH) – limited to the 10 first results (fig. 5.17); `Name` + `Identifier` (goddess). Also in this case results of the *Dynamic Graph* are visualized through *Highcharts*, can be printed, and can be downloaded as PNG image, JPEG image, PDF document and SVG vector image. It is also possible to hide/show graphs by selecting/deselecting entries in the list at the right of the chart, and visualize the number of occurrences in each book of the *Deipnosophists* by hovering the mouse over the selected book.[111] The *Digital Athenaeus* project provides scholars with a *Web API* with a JSON output of *Index Digger* queries of the *Index of Authors, Texts, and Persons* of Olson:[112]

```
api.php?what=<search string>&where=<search field>&exact=[yes:no]
```

Search fields of the Web API can be one of the following: `name`, `identifier`, `sub_identifier`, `prosopographical_reference`, `prosopographical_reference_id`, `work`, `edition`, `edition_id`, `passage`, `book`, `casaubon_reference`, `kaibel_reference`. For example, if we want to know when and how Athenaeus refers to Cleidemus of Athens in the *Deipnosophists*, we get the following result:[113]

```
[
    {
        "id_key": "5023",
        "id": "5023",
        "Name": "Cleidemus of Athens",
        "Identifier": "historian",
        "Sub_Identifier": "",
        "Prosopographical_Reference": "",
        "Prosopographical_Reference_id": "",
        "Work": "",
        "Edition": "FGrH",
        "Edition_id": "323",
        "Passage": "F 11",
        "Book": "6",
        "Casaubon_Reference": "6.235a",
        "Kaibel_Reference": "6.26",
        "Votes": "0",
        "Is_Range": "",
```

---

111 Cf. fig. 5.12 for the *Index Scriptorum* of Meineke.
112 http://digitalathenaeus.org/tools/OlsonIndex/api.php
113 http://digitalathenaeus.org/tools/OlsonIndex/api.php?what=CleidemusofAthens&where=Name&exact=yes

```
        "Note_Reference": ""
    },
    {
        "id_key": "5024",
        "id": "5024",
        "Name": "Cleidemus of Athens",
        "Identifier": "historian",
        "Sub_Identifier": "",
        "Prosopographical_Reference": "",
        "Prosopographical_Reference_id": "",
        "Work": "",
        "Edition": "FGrH",
        "Edition_id": "323",
        "Passage": "F 5a",
        "Book": "14",
        "Casaubon_Reference": "14.660a",
        "Kaibel_Reference": "14.78@14.79",
        "Votes": "0",
        "Is_Range": "range start",
        "Note_Reference": ""
    },
    {
        "id_key": "5025",
        "id": "5025",
        "Name": "Cleidemus of Athens",
        "Identifier": "historian",
        "Sub_Identifier": "",
        "Prosopographical_Reference": "",
        "Prosopographical_Reference_id": "",
        "Work": "",
        "Edition": "FGrH",
        "Edition_id": "323",
        "Passage": "F 5a",
        "Book": "14",
        "Casaubon_Reference": "14.660b",
        "Kaibel_Reference": "14.79",
        "Votes": "0",
        "Is_Range": "range end",
        "Note_Reference": ""
    },
    {
        "id_key": "5026",
        "id": "5026",
        "Name": "Cleidemus of Athens",
        "Identifier": "historian",
        "Sub_Identifier": "",
        "Prosopographical_Reference": "",
        "Prosopographical_Reference_id": "",
        "Work": "",
```

```
            "Edition": "FGrH",
            "Edition_id": "323",
            "Passage": "F 5b",
            "Book": "14",
            "Casaubon_Reference": "14.660d",
            "Kaibel_Reference": "14.79@14.80",
            "Votes": "0",
            "Is_Range": "range start",
            "Note_Reference": ""
        },
        {
            "id_key": "5027",
            "id": "5027",
            "Name": "Cleidemus of Athens",
            "Identifier": "historian",
            "Sub_Identifier": "",
            "Prosopographical_Reference": "",
            "Prosopographical_Reference_id": "",
            "Work": "",
            "Edition": "FGrH",
            "Edition_id": "323",
            "Passage": "F 5b",
            "Book": "14",
            "Casaubon_Reference": "14.660e",
            "Kaibel_Reference": "14.80",
            "Votes": "0",
            "Is_Range": "range end",
            "Note_Reference": ""
        },
        {
            "id_key": "5028",
            "id": "5028",
            "Name": "Cleidemus of Athens",
            "Identifier": "historian",
            "Sub_Identifier": "",
            "Prosopographical_Reference": "",
            "Prosopographical_Reference_id": "",
            "Work": "",
            "Edition": "FGrH",
            "Edition_id": "323",
            "Passage": "F 5c",
            "Book": "10",
            "Casaubon_Reference": "10.425e",
            "Kaibel_Reference": "10.26",
            "Votes": "0",
            "Is_Range": "",
            "Note_Reference": ""
        }
    ]
```

The index of Olson includes the following 1,293 unique English expressions to identify authors, texts, and persons:[114]

accompanied Jason (1) - Achaean deity (1) - actor (5) - addressee of Alcaeus (1) - addressee of Anacreon (1) - addressee of Archestratus of Gela (2) - addressee of Lynceus of Samos (1) - addressee of Nicaenetus (1) - addressee of Parmeniscus and historian (1) - addressee of Pindar (1) - addressee of Sappho (1) - addressee of Semonides (1) - addressee of Theognis (1) - agent of Philip II (1) - Alexander the Great's chief financial officer in Egypt (1) - Alexander's regent in Greece (1) - alleged inventor of dialogue genre (1) - alleged plagiarist (1) - alleged Pythagorean (3) - ally of Heracles (1) - ally of Philip II (1) - also known as Hellôtis (1) - also known as Lightning-Bolt (1) - Amazon mother of Hippolytus (1) - ambassador to Artaxerxes II (1) - ambassador to Dionysius II (1) - ambassador to Nicodemus (1) - ambassador to Persia (2) - ambidextrous Homeric hero (1) - ancestor of Althephius (1) - ancestor of Leagrus (1) - Apollo's priestess (1) - Apollo's priestess at Delphi (1) - Ares-like deity (1) - aristocrat (1) - Ariston's general on Delos (1) - artisan (1) - as Clymenus (1) - as god (1) - as Heracles' mother (1) - as historian (1) - as Lord of Hosts (1) - as Prytanitis (1) - as Theodorus (1) - aspired to tyranny (2) - assessor (1) - associate of Alexander the Great (6) - associate of Antagoras of Rhodes (1) - associate of Demetrius Poliorcetes (3) - associate of Philip II (2) - associate of Philip II and Plato (1) - associate of Socrates (2) - associate of Socrates and sophist (1) - associate of Socrates and Xenophon (1) - associated with Dionysus and drinkers (1) - astronomer-poet (1) - Athenaeus' interlocutor, ix (1) - Athenian general (3) - Athenian priestly family (2) - athlete (2) - athlete and glutton (3) - athletic trainer (3) - attempted coup against Antiochus VIII (1) - attendant of pampered Paphian boy (3) - Attic hero (1) - aulode (2) - author of amusing songs (1) - author of Art of Fishing (1) - author of Art of Interpretation (1) - author of Changes of Names (1) - author of Cynics' Drinking Party, xiii (1) - author of epic poem about Heracles (1) - author of epic poem on fishing (1) - author of Erotic Technique (1) - author of Geography (1) - author of Halieutica (2) - author of Humorous Memoirs (1) - author of hymn to Glaucus (1) - author of Korônistai (1) - author of Literal Tragedy (1) - author of Maritime Occupations (1) - author of Obscure Sayings (1) - author of On Animals (1) - author of On Epigrams (1) - author of On the Sense of Words (1) - author of On the Stage (1) - author of Origin of Birds (1) - author of paeans (1) - author of Paignia (2) - author of Returns (1) - author of riddle (1) - author of Strange Creatures (1) - author of The Host (1) - author of Theatrical Commentaries (1) - author of treatise on agriculture (1) - author of treatise on Alcman (1) - author of treatise on ball-playing (1) - author of treatise on bread-making (1) - author of treatise on cake-making (5) - author of treatise on cakes (1) - author of treatise on citharodes (1) - author of treatise on Cleoboulina's Obscure Sayings (1) - author of treatise on cooking (2) - author of treatise on dancing (1) - author of treatise on Elean festivals (1) - author of treatise on farming (2) - author of treatise on figs (1) - author of treatise on fish (1) - author of treatise on fishing (3) - author of treatise on flowers (1) - author of treatise on great ship of Hieron I (1) - author of

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treatise on iambic poets (1) - author of treatise on mechanics (1) - author of treatise on mining (1) - author of treatise on music (1) - author of treatise on perfumes and garlands (1) - author of treatise on pipe-players (2) - author of treatise on pipes and pipe-players (1) - author of treatise on proverbs (1) - author of treatise on Red Sea (1) - author of treatise on root-gathering (1) - author of treatise on sculptors (1) - author of treatise on sex (1) - author of treatise on siege-machinery (1) - author of treatise on siege-machines (1) - author of treatise on Syracusan institutions (1) - author of treatise on triremes (1) - author of treatise on vegetables (1) - author of treatise on wild animals (1) - author of treatise on wreaths (1) - author of treatise on wreaths or flowers (1) - author of treatises on music and choruses (1) - author of treatises on vegetables, saltfish, and shellfish (1) - author(s) of treatise(s) on cooking (1) - baker (1) - ballplayer (1) - ballplayer and brother of sophist Theocritus (1) - banker (2) - bard of Astyages (1) - bartender (1) - beautiful and wise woman (1) - befriended dolphin (1) - belletrist and wit, xiii (1) - beloved of Agamemnon (1) - beloved of Alcibiades (1) - beloved of Alcman (1) - beloved of Aphrodite (2) - beloved of Argynnus (1) - beloved of Cyclops (1) - beloved of Eriphanis (1) - beloved of Glaucus (1) - beloved of Philoxenus (1) - beloved of Pindar (1) - beloved of Pythagoras (1) - beloved of Sappho (1) - beloved of Zeus (1) - benefactor of Athens (1) - beseiged Phalanthus king of Ialysus (1) - betrayed Greeks to Tissaphernes (1) - betrayed Phalanthus king of Ialysus (1) - biographer and poet (1) - bodyguard and successor of Alexander the Great (1) - Boeotian deity (2) - book-collector (2) - boy befriended by dolphin (1) - boy loved by Atticus (1) - boy loved by goose (1) - boyfriend of Antiochus II (1) - boyfriend of Demetrius of Phaleron (1) - boyfriend of Demosthenes (1) - boyfriend of emperor Hadrian (1) - boyfriend of Epaminondas of Thebes (1) - boyfriend of Sophocles (1) - breastplatemaker (1) - bride of Antiochus III (1) - bridegroom mentioned by Asius (1) - brother of Alcibiades (1) - brother of Cassander of Macedon and founder of Ouranopolis (1) - brother of Cleopatra (1) - brother of Cnopus (1) - brother of Demetrius of Phaleron (1) - brother of Euthydemus (1) - brother of Homeric Ajax of Salamis (1) - brother of Menecrates the Epicurean (1) - brother of Pythodorus of Athens (1) - brother of Sappho (2) - bucolic and epigrammatic poet (1) - called Apollo by Menecrates of Syracuse (1) - called Mentor (1) - Calm personified (1) - Cassander's general (1) - Cassander's general in Munychia (1) - catalogue poet (1) - cause of Crisaic War (1) - cause of Third Sacred War (1) - Celtic chieftain (1) - centaur (2) - charlatan (1) - chief official of Lysimachus (1) - child of Fish and Peace-and-Quiet (1) - cithara-player (1) - citharaplayer (1) - citharode (11) - citharode and deipnosophist (1) - citharode and dithyrambic poet (1) - citharode and lyric poet (1) - citharodic parodist (1) - clever lover (1) - cleverly evaded sumptuary law (2) - client of Eirenis (1) - client of Nico (1) - client of Phryne of Thespiae (1) - close friend of Ctesippus (1) - clown (1) - co-founder of Olympic games (1) - collector of cups (1) - comedian (2) - comedian and dancer (1) - comic (1) - comic actor (6) - comic and iambic poet (1) - comic cook (1) - comic poet (111) - comic poet and anecdotalist (1) - comic poet and memoirist (1) - comic poet, 1.4d n. (1) - comic slave (1) - commander and successor of Alexander the Great (1) - commented on lentil soup in tragedy (1) - companion of Alexander the Great (3) - companion of Alexander the Great and historian (1) - companion of Alexander the Great and satrap of Lydia (1) - companion of Dionysus and

Homeric priest of Apollo at Ismarus (1) - companion of Heracles (1) - companion of Mimnermus (1) - companion of Socrates (1) - companion of Xenophon (3) - compared to Rhadamanthys (1) - composed fables (1) - concubine associated with Oxyartis (1) - concubine of Achilleus (1) - concubine of Agamemnon (1) - concubine of Heracles (1) - consumed only milk (1) - cook (13) - cook and first Olympic victor (1) - cook for Demetrius of Phaleron (1) - cook for Olympias and Alexander the Great (1) - cook in Larensius' house (1) - cookbook author (8) - correspondent of Lynceus of Samos (1) - courtesan (81) - courtesan and glutton (1) - courtesan and lover of Demetrius Poliorcetes (1) - courtesan and lover of Hermesianax of Colophon (1) - courtesan and lover of Menander (1) - courtesan and lover of Ptolemy II (4) - courtesan and lover of Ptolemy IV (1) - courtesan and lover of Seleucus II (2) - courtesan and mother of younger Laïs (1) - courtesan and notorious drinker (1) - courtesan and owner of Bacchis (1) - courtesan and student of Plato (1) - courtesan associated with Alcibiades (1) - courtesan associated with Alexander the Great and Ptolemy I (1) - courtesan associated with Antimachus of Colophon (1) - courtesan associated with Charaxus (1) - courtesan associated with Cyrus the Younger (1) - courtesan associated with Demetrius of Phaleron (1) - courtesan associated with Demetrius Poliorcetes (4) - courtesan associated with Epicurus (1) - courtesan associated with Harpalus (1) - courtesan associated with Hyperides (2) - courtesan associated with Isocrates (1) - courtesan associated with Lamynthius of Miletus (1) - courtesan associated with Lysias (1) - courtesan associated with Lysias and Isocrates (1) - courtesan associated with Sophocles (2) - courtesan associated with Stephanus (1) - courtesan associated with Themistocles (1) - courtesan beloved of Pericles and Socrates (1) - courtesan in Alexandria (1) - courtesan loved by Harpalus (1) - courtesan loved by Ion (1) - courtesan mentioned by Hedylus (1) - courtesan murdered in temple of Artemis (1) - credited with the invention of Phrygian scale (1) - creditor (1) - Cretan lawgiver (1) - critic of Aristotle (2) - crossed desert without growing thirsty (1) - cured of epilepsy by Menecrates of Syracuse (1) - Cynic philosopher (4) - Cynic philosopher and deipnosophist, x (1) - Cyrenaic philosopher (1) - dancer (9) - dancer and choreographer (1) - dancer and flatterer (1) - dancing-girl favored by Philomelus of Thebes (1) - dandy (1) - daughter of Acrisius and mother of Perseus (1) - daughter of Agemon (1) - daughter of Aristeides of Athens, purported wife of Socrates (1) - daughter of Cadmus (1) - daughter of Cleisthenes of Sicyon (1) - daughter of Eurystheus (1) - daughter of Gnathaena, Courtesan (1) - daughter of Homartes and most beautiful woman in Asia (1) - daughter of Icarius (1) - daughter of Janus (1) - daughter of King Cecrops of Athens (1) - daughter of Leontion the Epicurean (1) - daughter of Megacles of Alexandria, female trumpeter (1) - daughter of Minos (1) - daughter of Nanos, renamed Aristoxene (1) - daughter of Neaira (1) - daughter of Oxylus (1) - daughter of Phalanthus, king of Ialysus (1) - daughter of Philip II (2) - daughter of Procles, married Periander of Corinth (1) - daughter of Pronax (1) - daughter of Ptolemy I and Thaïs (1) - daughter of Socrates, wife of Hipparchus son of Pisistratus (1) - daughter of Thyrsus (1) - daughter of Triopas (1) - daughters murdered Minos (1) - daughters of Atlas and Pleione (2) - dealer in castrated boys (1) - deceitful employer of Heracles (1) - dedicant at Delphi (1) - dedicated cup on Delos (1) - dedicated hair at Delphi (1) - dedicated Scholar (1) - deipnosophist (3) - deity (3) - deity worshipped in Munychia (1) - delivered Against Neaira (1) -

demagogue (2) - devotee of Leto (1) - devotee of sympotic pleasure (1) - didactic poet (2) - didactic poet, historian, and grammarian (1) - dinner-guest of Ptolemy I (1) - discussed birth of Helen from egg (1) - distinguished theatrical figure (1) - dithyrambic parodist (1) - dithyrambic poet (6) - dithyrambic, epic, and epigrammatic poet (1) - dogs Pythodelus (1) - doomed lover (1) - drinker (1) - drinker mentioned by Alcaeus (1) - drinker mentioned by Hedylus (1) - drinking-companion of Pindar (1) - drowned Atargatis and Ichthys (1) - early Greek king (1) - effeminate (1) - Egyptian dancer and fertility god (1) - Egyptian deity (1) - Egyptian king (1) - Egyptian lover of Ptolemy II (1) - elegiac poet (7) - elegiac poet and general (1) - Eleusinian hierophant and enemy of Aristotle (1) - emaciated (1) - emaciated politician (1) - Emesan deity (1) - enemies of Olympian gods (2) - enemy of Antigonus Gonatas (1) - enemy of Aristotle (1) - enemy of Epicurus (1) - enemy of Heracles (1) - enemy of King Agesilaus of Sparta (1) - enemy of Mimnermus (1) - enemy of Philip II (1) - engineer (3) - engraver of cups (7) - entertained narrator of Callimachus' Hecale (1) - envoy to Delphi (1) - envoy to Gelon (1) - epic and elegiac poet (1) - epic and epigrammatic poet (1) - epic and tragic poet and historian (1) - epic hero and enemy of Odysseus (1) - epic poet (8) - epic poet and memoirist, author of Erotica (1) - epic poet, author of Sack of Troy (1) - epic, lyric, and epigrammatic poet and grammarian (1) - epic/elegiac (1) - Epicurean philosopher (4) - Epicurian philosopher and tyrant of Samos (1) - epigrammatic poet (7) - epigrams (1) - epinician poet (2) - eponymous archon for 348/7 BCE (1) - eponymous archon for 349/8 BCE (1) - eponymous archon for 366/5 or 323/2 BCE (1) - eponymous archon for 403/2 BCE (1) - eponymous archon for 406/5 BCE (1) - eponymous archon for 417/6 BCE (1) - eponymous archon for 420/19 BCE (1) - eponymous archon for 421/0 BCE (1) - eponymous archon for 422/1 BCE (1) - eponymous archon for 423/2 BCE (1) - eponymous archon for 424/3 BCE (1) - eponymous archon for 429/8 BCE (1) - eponymous archon for 430/29 BCE (1) - eponymous archon for 431/0 BCE (1) - eponymous archon for 432/1 BCE (1) - eponymous hero of tragedy by Antiphon (1) - erotic Poet (2) - eunuch loved by Alexander the Great (1) - eunuch of Sardanapallus (1) - Euripidean hero (1) - expert at games (2) - explored Moroccan coast (1) - father of Ajax and companion of Heracles (1) - father of Alcibiades (1) - father of Alcyone (1) - father of Amphithea (1) - father of Andocides (1) - father of anonymous glutton attacked by Hipponax (1) - father of Anticleia (1) - father of Daochos (1) - father of Glaucus (3) - father of Hamadryad nymphs (1) - father of Homeric Achilleus (1) - father of Lamia (1) - father of Lepreus (1) - father of Molionidae (1) - father of Musaeus (1) - father of Ocyroe (1) - father of Odysseus (1) - father of Olympian gods (1) - father of Orpheus (1) - father of Oxylus and Hamadryas (1) - father of Penelope (1) - father of Philoxenus the glutton (1) - father of Phoenix (1) - father of Pleiades (1) - father of Scylla (1) - father of Sepia (1) - father of Theodorus the pipe-player (1) - father of Theseus (1) - father of tortoise (1) - father-in-law of Antiochus III (1) - fatherof Callias (1) - favorite of Lysimachus (1) - fell in love with statue (1) - female glutton (1) - ferryman of the Underworld (1) - ferryman transformed into fish (1) - first author of a Gastrology (1) - first teacher of hoplite fighting (1) - first wife of Aegeus (1) - fish-seller (2) - fisherman transformed into fish (1) - fishseller (1) - flatterer of Agathocles son of Oenanthe (1) - flatterer of Alexander II (1) - flatterer of Alexander the Great (1) - flatterer of Antigonus Doson (1) - flatterer of Attalus I (1) - flatterer of Cavarus of

Thrace (1) - flatterer of Dionysius I (1) - flatterer of Dionysius II (1) - flatterer of Dionysus I and II (1) - flatterer of Hieronymus of Syracuse (1) - flatterer of Hieronynus of Syracuse (1) - flatterer of Licinius Crassus and tyrant (1) - flatterer of Mithridates VI (1) - flatterer of Persian king (1) - flatterer of Philip II (1) - flatterer of Philip V (1) - flatterer of powerful men (1) - flatterer of Ptolemy III (1) - flatterer of Seuthes of Thrace (1) - flatterer of Sisyphus of Pharsalus (1) - food-snatching monsters (1) - fought Achilleus (1) - founder of Gela (1) - founder of Ozolian Locris (1) - founder of Phaselis (1) - founder of Rome (1) - founder of Syracuse (1) - friend of Alcibiades (1) - friend of Alexander the Great (1) - friend of Archestratus of Gela (1) - friend of Epicurus (1) - friend of Heracles (1) - friend of Naïs (1) - friend of Pompeianus of Philadelphia (1) - friend of Roman emperor Trajan (1) - friend of Sophocles and Athenian proxenos (1) - gambler (1) - gastronomic poet (1) - gave name to Althephian vine (1) - gave name to Anthedonias wine (1) - gave name to drinking vessel (1) - gave name to Hypereias wine (1) - general (22) - general at Arginusae (1) - general at Delium (1) - general of Alexander the Great (1) - general of Demetrius II Nicator (1) - general of Philip II (1) - general of Philip II and companion of Alexander the Great (1) - general of Ptolemy II (1) - generous host (1) - geographer (6) - Giant (1) - giant hunter (1) - giant killed by Athena (1) - girl described by Sappho (1) - glutton (28) - glutton and cookbook author (1) - glutton and opponent of Heracles (1) - gnomic poet (1) - goat that nursed Zeus (1) - god of healing (1) - goddess (3) - goddess of retribution (1) - goddess who supplies prophecies via dreams (1) - got books of Euripides and Aristotle (1) - got Persian gold (1) - grammarian (49) - grammarian and author of treatise on cooking (1) - grammarian and deipnosophist (5) - grammarian and deipnosophist, xi (1) - grammarian and historian (1) - grammarian and student of Aristonicus (1) - grammarian and student of Tryphon (1) - grammarian and symposiarch, x, xi, xii (1) - grammarian or historian (1) - grammarian, xiii (1) - grandson of Demetrius of Phaleron and spendthrift (1) - guard-dog of Underworld (1) - guest at symposium (1) - harp-player (3) - harpplayer (1) - head of the Academy (1) - Health personified (1) - hedonist (5) - hedonist mentioned by Anacreon (1) - hedonist mentioned by Archilochus (1) - hedonist philosopher, xiii (1) - Heracles' teacher (1) - herald and mimeactor (1) - herald of Heracles (1) - hero (2) - hero and son of Danae (1) - Herodotean courtesan (1) - Hesiodic Hundredhander (1) - hexameter poet (2) - hierophant (1) - hilarodic poet (1) - historian (193) - historian and boyfriend of Antiochus II (1) - historian and comic actor (1) - historian and grammarian (3) - historian and orator (1) - historian and poet (2) - historian and rhetorician (1) - historian of philosophy (1) - historian or grammarian (1) - historian(s) (1) - historian, epic poet, and grammarian (1) - historian, grammarian, and lyric poet (1) - holy man and possible author of Telchinian History (1) - Homeric Athena in disguise (1) - Homeric bard (2) - Homeric companion of Achilleus (1) - Homeric goatherd (1) - Homeric goddess (1) - Homeric herald (2) - Homeric hero (16) - Homeric king of Phaeacia (1) - Homeric king of Pylos (1) - Homeric monster (1) - Homeric princess (1) - Homeric singers (1) - Homeric Trojan (1) - Homeric villain (1) - Homeric warrior (2) - Homeric whirlpool (1) - Homeric witch (1) - horse belonging to Helios (1) - horse-men associated with Dionysus (1) - host of Cynic drinking party (1) - host of dinner party attended by Philoxenus the Heel-tapper (1) - host of Helen and Menelaus (1) - host of Heracles (1) - host of the dinner-party, viii (1)

- host of Xenophon (1) - hosted Astyanax of Miletus (1) - hosted enormous feast (1) - hosted Euphorion at dinner (1) - hosted Himerus (1) - hosted wedding feast attended by Hippolochus of Macedon (1) - hosted Xerxes' army (1) - human being transformed into Poseidon's groom (1) - iambic poet (9) - indecent poet (2) - Indian deity (1) - Indian king (1) - Indian philosopher (1) - invective poet and philosopher (1) - invented sikinnisdance (1) - inventor of Pan-pipe (2) - inventor of pneumatic devices (1) - inventor of satyrdance (1) - Ionicologos (1) - Ionikologos (2) - ithyphallic deity (2) - ithyphallic poet (1) - Kerykid priest and grammarian (1) - kidnapped by Glaucus (1) - king of Argos (1) - king of Argos and father of Danae (1) - king of Armenia (1) - king of Assyria (2) - king of Athens (10) - king of Avernians (1) - king of Babylon and Seleucia (1) - king of Bithynia (4) - king of Boeotian Orchomenos (1) - king of Cappadocia (1) - king of Crete (1) - king of Crobyzoi (1) - king of Cyprian Salamis (3) - king of Cyprian Soli (1) - king of Cyprus (1) - king of Cyprus and father of Adonis (1) - king of Cyrene (1) - king of Egypt (15) - king of Egypt and memoirist (1) - king of Epirus (1) - king of Ialysus (1) - king of Illyria (2) - king of India (1) - king of Iolcus (1) - king of Lapiths (1) - king of Leleges (1) - king of Libya (1) - king of Lydia (5) - king of Lydia and glutton (1) - king of Macedon (8) - king of Macedon and brother of Philip II (1) - king of Macedon and father of Alexander the Great (1) - king of Macedon and notorious drinker (1) - king of Marathoi and father of Odatis (1) - king of Massilia (1) - king of Mauretania and historian (1) - king of Molossia (1) - king of Numidia (1) - king of Odrysia (1) - king of Oechalia (1) - king of Paphlagonia (1) - king of Parthia (1) - king of Pergamum (4) - king of Persia (7) - king of Pherae (1) - king of Phrygia (1) - king of Phylace (1) - king of Pontos (2) - king of Rhodes (1) - king of runaway slaves (1) - king of Salmydessus (1) - king of Sidon (1) - king of Sipylus and father of Pelops (1) - king of Sotiani (1) - king of Sparta (10) - king of Syria (6) - king of Syria (unclear which) (1) - king of Taphians (1) - king of the Celaenai and glutton (1) - king of the Celts (2) - king of the Lapiths (1) - king of the Medes (1) - king of the Messapians (1) - king of Thebes (4) - king of Thessaly (1) - king of Thrace (4) - king of Troy (1) - king of Troy and father of Ganymede (1) - king visited by ambassadors from Tauromenium (1) - lawgiver (2) - lawgiver and sage (1) - lawgiver of Catana in Sicily (1) - lawgiver of Epizypherean Locris (1) - lawgiver, elegiac poet, and sage (1) - leader of Argonauts (1) - led colony to Lesbos (1) - led revolt against Pisistratids (1) - left cup as prize for wisdom (1) - legal guardian of Naïs (1) - legal scholar, poet, and deipnosophist, xi (1) - legendary founder of Carian Cnidus (1) - legendary founder of Erythrae (1) - legendary founder of Thebes (1) - legendary seer (2) - lexicographerand deipnosophist (1) - librarian of Alexandria, poet, historian, and philosopher (1) - Libyan nomad credited with inventing pipe-playing (1) - literary historian (1) - litigant (1) - lord of Underworld (1) - love interest of Calycê (1) - love personified (1) - love-interest of Harpalycê (1) - love-object in Callimachus (1) - love-object of Ibycus (1) - love-object of Pindar (1) - loved Pyrrhus (1) - lover of Agathon (1) - lover of Alcibiades (1) - lover of Archippe (1) - lover of Cratinus of Athens (1) - lover of Dorus (1) - lover of Hesiod (1) - lover of Laïs (1) - lover of Musaeus (1) - lover of Naïs (1) - lover of Neaira (1) - lover of Nico (1) - lover of Orpheus (1) - lover of Ptolemy II (1) - lover of Python (1) - lover of Rhadamanthys the Just (1) - lover of Seleucus II (1) - lover of Telesis (1) - lover of Zeus (2) - lyre-

player (3) - lyreplayer (3) - lyreplayer and magician (1) - lyric (1) - lyric and elegiac poet (1) - lyric and epigrammatic poet (1) - lyric and tragic poet (1) - lyric poet (14) - lyric poet and joker (1) - lyric poetess (3) - Macedonian nobleman and general (1) - Macedonian princess (2) - made witty remark about parasite (1) - magician (3) - magician and mime-actor (1) - magician and musician (1) - married daughter of King Nanos (1) - married Strymbele/Phano (1) - masterbuilder (1) - mathematician (1) - mathematician and geographer (1) - Megarian philosopher (1) - member of Areopagus Council and Parasite (1) - member of court of Demetrius Poliorcetes (2) - member of Socrates' circle (1) - Memory personified (1) - mentally defective son of Philip II (1) - mentioned by Callimachus (1) - mentioned by Hipponax (1) - mercenary commander (2) - messenger of the gods (1) - metal-worker (1) - metalworker (1) - military commander (1) - military commander and glutton (1) - mime-actor (2) - mime-actress and lover of Ptolemy II (1) - mime-author (1) - mimeauthor (1) - mimic (1) - mistress of Dionysius I of Syracuse (1) - mocked as fox-shit (1) - monster (2) - monster that plagued Thebes (1) - monstrous enemy of gods (1) - monstrous herdsman (1) - monstrous snake killed by Apollo (1) - mortal father of Heracles (1) - mortal loved by Sleep (1) - mortal lover of Dawn (2) - mortal lover of Demeter (1) - mother of Achilleus (1) - mother of Ajax (1) - mother of Alcibiades (1) - mother of Alexander the Great (1) - mother of Arrhidaeus (1) - mother of Bion of Borysthenes (1) - mother of Callistion (1) - mother of courtesan Glycera (1) - mother of Dionysus (1) - mother of Glaucus (2) - mother of Hamadryad Nymphs (1) - mother of Hedyle (1) - mother of Helen and Dioscuri (1) - mother of Heracles (1) - mother of Hermes (1) - mother of Lepreus (1) - mother of Lysandridas (1) - mother of Mopsus (1) - mother of Odysseus (1) - mother of Olynthus (1) - mother of Philetaerus of Pergamum (1) - mother of Pleiades/Peliades (1) - mother of Themistocles (2) - mother of Theseus (1) - mother of Tigris of Leucas (1) - mother of Zeus (1) - murderous witch (1) - Muse (2) - Muse-like figure (1) - music-theorist (1) - musician (7) - musician and deipnosophist (1) - musician and magician (1) - musician and poet (1) - musicologist (1) - mystic philosopher (1) - mythical craftsman (2) - mythical epic singer (2) - mythical monster (1) - mythical seer (1) - mythical Spartan king (1) - natural scientist and philosopher (1) - naturalist (1) - naval commander (1) - never grew thirsty (2) - nickname of first Athenian to shave his beard (1) - North Wind personified (1) - notorious courtesan (3) - notorious drinker (5) - notorious drinker (and politician?) (1) - notorious wit (3) - notorious wit and glutton (1) - nurse of Alexander the Great (1) - nurse of Odysseus (1) - nymph (1) - nymph raped by Apollo (1) - nymphs who guard golden apples (1) - obese hedonist (1) - object of song for Philetas (1) - Odysseus' swineherd (1) - officer of Alexander the Great (1) - Old Man of the Sea (1) - oligarch (1) - Olympian deity (13) - Olympian goddess (1) - Olympic victor (1) - one of Fates (1) - one of Seven Against Thebes (3) - one of Seven Wise Men (2) - one of tyrants of Piraeus (1) - opponent of philosophers (1) - oracular god (1) - orator (17) - orator and historian (2) - orator and speech-writer (1) - original Cynic (1) - original Stoic philosopher (1) - overthrew Sardanapallus (1) - owner of slave-prostitutes (1) - owner of the pipegirl Bromias (1) - painter (6) - pancratiast (3) - pancratiast and associate of Alexander the Great (1) - pancratiast and parasite of Aristomachus of Argos (1) - pantomime dancer (1) - parasite (7) - parasite of Antiochus VIII (1) - parasite of Athena (2) - parasite of Demetrius

Poliorcetes (1) - parasite of Lysimachus (1) - parasite of Seleucus I (1) - parodic (1) - parodist (9) - parodist and comic poet (1) - parodists (1) - paroemiographer (3) - participant in Parmeniscus' Cynics' Drinking Party (1) - participated in boar-hunt (1) - participated in founding of Phaselis (1) - pauper (1) - pauper and glutton (1) - pedant (3) - perfume-maker (4) - perfumeseller (1) - Peripatetic philosopher (12) - Peripatetic philosopher and governor of Athens (1) - Peripatetic philosopher and historian (2) - Peripatetic philosopher and poet (1) - Peripatetic philosopher and tyrant (1) - Persian deity (2) - Persian general (1) - Persian nobleman (1) - Persian satrap (4) - personified (30) - personified mountain where Dionysus was born (1) - Phaeacian herald (1) - philosopher (17) - philosopher and author of paean in honor of Craterus (1) - philosopher and deipnosophist (1) - philosopher and deipnosophist, xi (2) - philosopher and member of Socrates' circle (1) - philosopher and naturalist (1) - philosopher and poet (1) - philosopher and soldier, xiii, xiv (1) - philosopher, biographer, and bore (1) - philosopher, wrestler, and tyrant (1) - philosopher, xiii, xiv (1) - philosopher-poet (1) - philosophical historian (1) - phlyax poet (4) - Phrygian pipe-player (6) - phylarch (1) - physician (25) - physician and author of treatise on perfumes and garlands (1) - physician and deipnosophist (1) - physician and deipnosophist, x (1) - physician and deipnosophist, xi (2) - physician and poet (1) - physician to Alexander the Great (1) - Pindaric singers (1) - pipe-girl (2) - pipe-girl and owner of Pythionice (1) - pipe-girl associated with Mimnermus (1) - pipe-player (20) - pipe-player and flatterer of Ptolemy VII (1) - pipe-player and parasite of Antiochus III (1) - pipeplayer (3) - pipeplayer and pedant (1) - pipeplayer and poet (1) - plaque-painter (1) - plotted against Cnopus (3) - poet (18) - poet and grammarian (1) - poet and judge for Attalus I (1) - poet and orator (1) - poet and philosopher (1) - poet and scholar (1) - poetess (5) - polemarch (1) - politician (17) - politician and ambassador to Persia (1) - politician and bean-eater (1) - politician and donkey (1) - politician and general (4) - politician and glutton (3) - politician and notorious drinker (1) - politician and spendthrift (1) - pornographer (1) - pornographic painter (3) - possible author of Telchinian History (1) - possible author of Titanomachy (2) - possible author of treatise on agriculture (2) - potter (7) - Presocratic philosopher (6) - pretender to Persian throne (1) - priestess of Athena (1) - prince of Nemea (1) - prince of Thebes torn apart by his own dogs (1) - prince of Troy (3) - prince of Troy and husband of Dawn (1) - pro-Macedonian leader? (1) - prominent citizen (1) - prophet (1) - proposer of decree (1) - prostitute married by Hieronymus of Syracuse (1) - Pseudepicharmeia (1) - pseudo-historical Egyptian priest (1) - psilocitharistês (3) - Ptolemaic official (1) - pupil and supposed boyfriend of Parmenides (1) - puppeteer (1) - purchased kingship (1) - purported author of pseudepicharmic texts (1) - purported author of treatise on sex (1) - purported founder of Gumnopaidiai Festival (1) - Pygmy woman (1) - Pythagorean philosopher (7) - Pythagorean philosopher and mathematician (1) - Quadrennial Festival personified (1) - quartermaster of Alexander the Great and historian (1) - queen of Assyria (1) - queen of Egypt (4) - queen of Lemnos (1) - queen of Lydia (1) - queen of Thebes (3) - queen of Tiryns (1) - queen of Troy (1) - rebel gladiator (1) - rebel slave-leader in Sicily (1) - red-hot (1) - regent of Philip V (1) - rescued Phorbas and Parthenia (1) - restrained pederast (1) - rhapsode (4) - rhythmician perhaps author of Pherecr. fr. 162 (1) - riddler (1) - rival of Mimnermus (1) - rival turned friend of Plangon of

Miletus (1) - Roman consul (4) - Roman emperor (4) - Roman emperor, vii (1) - Roman emperor, vii, viii (2) - Roman general (10) - Roman general and dictator (1) - Roman general and statesman (1) - Roman god of doors and beginnings (1) - Roman hedonist (1) - Roman literary scholar (1) - Roman magistrate (1) - Roman politician and philosopher (1) - Roman statesman (1) - Roman statesman and general (1) - ruler of Ephesus (1) - ruler of Pella (1) - sacrificed himself for city (1) - sage (1) - sage and poet, xii (1) - saltfish dealer (1) - saltfishseller (1) - saltfishvendor and glutton (1) - satrap of Babylon (1) - satrap of Caria (1) - satrap of Ecbatana (1) - satrap of Media (1) - satyr musician (1) - saved Cromnus (1) - Sceptic philosopher (1) - scholar and poet (3) - scholarly exegete (1) - sculptor (4) - sea–divinities (1) - sea–divinity (2) - second king of Rome (1) - second wife of Jason (1) - secretary of Alexander the Great and historian (1) - secretary to Antiochus Epiphanes (1) - seer (3) - seized Syrian throne (1) - Seleucid general (1) - Seleucid king (7) - seller of magic charms (1) - served with Caesar in Britain (1) - shape–shifting sea–divinity (1) - shared living quarters with son of Pericles (1) - sharp–sighted Argonaut (1) - shepherd who sold site of Phaselis (1) - shoemaker (1) - Siamese twins killed by Heracles (1) - Sicilian cowherd and inventor of boukoliasmos (1) - Sicilian deity (1) - sister and wife of Janus (1) - sister of Cimon (1) - sister of Odysseus (1) - sister of Xenopeitheia (1) - slave assistant of banker Pasion (1) - slave in Larensius' house (1) - slave killed by Heracles (1) - slave of impoverished braggart (1) - slave–holder and friend of Aristotle (1) - slave–woman belonging to Nestor (1) - slave–woman of Homeric Helen (3) - sleight–of–hand artist (1) - snake–haired monsters (1) - snake–like monster (1) - sold gold to Hieron I (1) - son of Aeolus, settled Lesbos after Great Flood (1) - son of Agamemnon (1) - son of Agesarchus of Megalopolis, historian (1) - son of Amphiaraus, one of Epigoni (1) - son of Amyclas of Sparta (1) - son of Amyntor (1) - son of Antigonus I (1) - son of Apollo, shepherd and beekeeper (1) - son of Arcadion (2) - son of Areius, historian (1) - son of Ariphon of Athens, nephew of Pericles (1) - son of Aristides the Just of Athens (1) - son of Aristotle (1) - son of Atargatis (1) - son of Athamas and Nephele (1) - son of Boreas (2) - son of Callaeschrus of Athens, tragic and elegiac poet, associate of Socrates, and one of Thirty Tyrants (1) - son of Callias (1) - son of Callimedon of Athens, politician (1) - son of Cecrops of Athens (1) - son of Cleinias of Athens, politician and libertine (1) - son of Conon of Athens, general (1) - son of Creusa and Apollo (1) - son of Crito of Athens, associate of Socrates (1) - son of Demeas of Athens, orator (1) - son of Demo and Demetrius Poliorcetes (1) - son of Demochares, flatterer of Dionysius I (1) - son of Deucalion and king of Aetolia (1) - son of Dionysus (1) - son of Dionysus and king of Calydon (1) - son of Ephorus (1) - son of Epilycus of Amphipolis, boyfriend of Onomarchus (1) - son of Eryxis of Athens, glutton (1) - son of Eurystheus (3) - son of Euxenus and Petta/Aristoxene (1) - son of Exaenetus of Acragas, Olympic victor (1) - son of Hector (1) - son of Heracles (1) - son of Heracles and Bolbe (1) - son of Hermodorus, author of treatise on sexual attraction (1) - son of Hipponicus of Athens, wealthy patron of sophists (1) - son of Homeric Menelaus (1) - son of Homeric Nestor (1) - son of Hyperides (1) - son of Ino (1) - son of Janus (1) - son of Laches of Athens, Eteoboutad (1) - son of Lycolas of Trichonium, boyfriend of Onomarchus (1) - son of Myrmidon, glutton (1) - son of Nestor (1) - son of Niceratus of Athens, general and politician (1) - son of Odysseus and Circe (1) - son of Odysseus and Penelope (1) -

son of Oedipus (1) - son of Oenanthe, contemporary of Ptolemy IV (1) - son of Oeneus (1) - son of Orestheus (1) - son of Pelops (2) - son of Perdix (1) - son of Pericleitus of Athens, parasite of Athena (1) - son of Pericles (2) - son of Philinus, pipe–player (1) - son of Philip II (1) - son of Phocion of Athens, spendthrift (1) - son of Phrynon of Thebes, hosted Xerxes' army (1) - son of Phylacus king of Phylace (1) - son of Poseidon (1) - son of Proteas of Macedon, attended Caranus' wedding feast (1) - son of Ptolemy I and Thaïs (2) - son of Ptolemy II, stood guard in Ephesus (1) - son of Pyles, killed by Heracles (1) - son of Pyrrhus, king of Molossia (1) - son of Pythodorus of Athens, suffered delusions of grandeur (1) - son of Smicrinus, notorious wit and parasite (1) - son of Sotades (1) - son of Tantalus of Sparta, mercenary commander (1) - son of Theon (1) - son of Thucydides of Athens, scribe (1) - son of Tiberius Caesar (1) - son of Timotheus of Athens, general (1) - son of Tithonus and Eos (1) - son of Triopas (2) - son of Zeus (2) - sons of Zeus and Leda (1) - sophist (13) - sophist and historian (1) - source of tree–medick (1) - source on Penelope–game (1) - Spartan deity (2) - spendthrift (6) - spendthrift and enemy of Rutilius (1) - spendthrift and glutton (1) - spread secret of agriculture (1) - starving parasite (1) - Stoic and Epicurean philosopher (1) - Stoic philosopher (9) - Stoic philosopher and historian (1) - student of Arcesilaus (2) - student of Aristophanes of Byzantium and grammarian (1) - student of Aristotle (1) - student of Dionysius and grammarian (1) - student of Epicurus (1) - student of Isocrates (1) - student of Plato (1) - student of Polyidus (1) - subject of toast in Hipponax (1) - sued Delians (1) - suitor of Cleisthenes' daughter (1) - suitor of daughter of Cleisthenes of Sicyon (1) - suitor of Penelope (2) - sun–god (1) - supposed author of The Crane (1) - supposed author of Tour of Asia (1) - supposed mother of Aristophon (1) - supposed namesake of city (1) - survived Great Flood (1) - symposiast in Alcman (1) - Syracusan comic poet (2) - Syrian queen and deity (1) - taught secret to success (1) - the Happiness philosopher (1) - theatrical producer (1) - Theban hero (1) - Thessalian courtesan (1) - Titan (1) - Titan who gave men fire (1) - Titaness and mother of Artemis and Apollo (1) - title–character of Platonic dialogue (2) - title–character of Platonic dialogue and sophist (1) - titlecharacter of Platonic dialogue (1) - topic of song for Theon (2) - trader (1) - tragic (1) - tragic actor (9) - tragic lover (1) - tragic poet (27) - tragic poet and actor and historian (1) - tragic poet and glutton (1) - tragic, lyric, and elegiac poet and memoirist (1) - travel writer (1) - treasurer of Alexander the Great (1) - Trojan elder and father of Aeneas (1) - Trojan elder and father of Homeric Helicaon (1) - Trojan hero (1) - Trojan prince (1) - Trojan prophetess (1) - Trojan War hero (1) - troublemaker (3) - trumpeter (1) - tyrannicide (2) - tyrant (17) - tyrant and friend of Cyrus the Great (1) - tyrant and historian (1) - tyrant and son of Pisistratus (2) - tyrant of Chios (2) - tyrant of Corinth (1) - tyrant of Crannon (1) - tyrant of Gela and Syracuse (2) - tyrant of Pontus (1) - tyrant of Sybaris (1) - tyrant of Syracuse (4) - tyrant of Syracuse and tragic poet (1) - tyrant who feasted suitors of his daughter (1) - uncle and adoptive father of Aristotle's wife Pythias (1) - uncle of Alcibiades (1) - Underworld deity (2) - Underworld river personified (1) - undesirable neighbor (1) - unidentified Persian (1) - unsuccessful tyrannicide (2) - urged invention of gladiatorial contests (1) - victor in pancration at Panathenaic games (1) - villain killed by Theseus (3) - visited Artaxerxes II (1) - vulgar joker and associate of son of Pericles (1) - wanderer and sage (1) - wandering showman (3) - wasted

wealth of Ischomachus (2) - water–drinker (1) - Wealth personified (1) - wealthy glutton (1) - wealthy host of Athenion (1) - wealthy man (4) - wealthy patron of the courtesan Pythionice (1) - wealthy peacock–breeder (1) - wealthy politician (1) - weaver (3) - wife of Admetus (1) - wife of Agamemnon (1) - wife of Agis II (1) - wife of Amphiaraus (1) - wife of Antiochus II (1) - wife of Athamas (1) - wife of Bagabyzus and sister of Xerxes (1) - wife of Cambyses (1) - wife of Cnopus (1) - wife of Ctesibius (1) - wife of Cypselus (1) - wife of Darius I (1) - wife of Demetrius Poliorcetes (1) - wife of Eumenes II of Pergamum (1) - wife of Hector (1) - wife of Homeric Alcinous (1) - wife of Lysimachus and Ptolemy Philadelphus, and queen of Egypt (1) - wife of Menelaus and Paris (1) - wife of Monimus (the son of Python) (1) - wife of Odysseus (1) - wife of Pelops (1) - wife of Persian king (1) - wife of Philip II (5) - wife of Polybus, guest–friend of Homeric Helen and Menelaus (1) - wife of Socrates (1) - wife of Theseus (5) - wine–pourer for Ptolemy II Philadelphus (1) - wine–steward of Nicomedes II (1) - winged horse (1) - winner of drinking–contest set by Alexander the Great (1) - woman intrigued by Artemon (1) - woman kept by Hyperides (1) - woman praised in adespota epic line (1) - woodland deity (1) - word–hunting friend of Ulpian (1) - worked silver mines with rented slaves (1) - wrote about Cotys (1) - young man abducted by nymphs (1).

This list shows the richness and variety of personal names and works cited in the text of Athenaeus, but it needs a further work of disambiguation to extract names of authors. Also, entries are in English and they generate a bigger distance than the Latin forms of Meineke and Kaibel for the alignment with the Greek text of the *Deipnosophists*.[115] The two following sections show how all these indices of the *Digital Athenaeus* project can be compared and used to map their entries on to the text of the Naucratites.

5.5.5 Book Stream

The *Book Stream* is a tool that performs and visualizes the automatic alignment of the four indices of the *Deipnosophists* of Athenaeus described in the previous sections:[116] *Index Scriptorum* by August Meineke; *Index Scriptorum* by Georg Kaibel; *Dialogi Personae* by Georg Kaibel; *Index of Authors, Texts, and Persons* by S. Douglas Olson. The tool is arranged by books and Kaibel paragraphs and each paragraph is linked to *Index to Text*, which is an experimental tool based on the *Levenshtein Distance* for the automatic alignment of index entries with their corresponding forms in the Greek text of the *Deipnosophists*.[117] Figure 5.18 shows the alignment of the entries of the four indices that correspond to *Deipn.* 1.1 on the basis of Kaibel paragraphs.[118] The menu on the left of the web page allows

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115 See section 5.5.6.
116 http://www.digitalathenaeus.org/tools/Book-Stream/
117 See section 5.5.6.
118 http://www.digitalathenaeus.org/tools/Book-Stream/book-stream.html#paragraph_1.1

to select a Kaibel paragraph and each entry of the corresponding paragraph is linked to the entry in the *Index Digger* of the selected index. The column in the middle with the number of the book and the paragraph is linkable and connected to the corresponding text in *Index to Text.*[119]
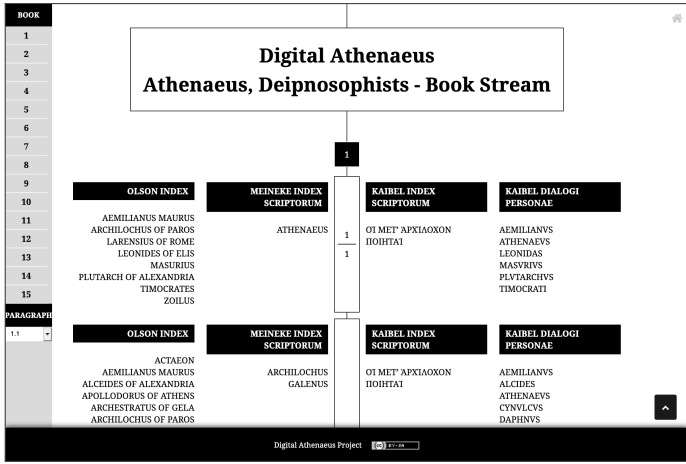

Figure 5.18. *Digital Athenaeus*: *Book Stream* (Ath., *Deipn.* 1.1)

5.5.6 Index to Text

Index to Text is a tool that automatically aligns each entry of the four indices of Athenaeus with the Greek text of the *Deipnosophists*.[120] The alignment is performed with a PHP implementation of the *Levenshtein Distance* that measures the distance between each element of each index entry and each word of the Greek paragraph corresponding to the Kaibel reference of the relevant entries. The alignment is based on the lowest of the following distances:[121] 1) between each index entry and all Greek words, 2) between each index entry and all transliterated Greek words, 3) between each index entry and all Greek words romanized into Latin (i.e., *c* instead of *k*, *us* instead of *os*, and *u* instead of *ou*), 4) between each index entry and all Greek transliterated words where the letter *k* is substituted with the letter *c*, 5) between each entry and both the transliterated and the

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119 For example, the paragraph of fig. 5.18 is linked to http://www.digitalathenaeus.org/tools /KaibelText/indexTOtext.php?passage=1.1&T=2.

120 The Greek text is based on the edition of Georg Kaibel: see section 5.3.1.

121 The reason of these distances is due to the fact that most of the entries are in Latin and in English (in the case of Olson) and can't be directly aligned with the Greek text.

romanized lemma of all Greek words (where the letter *k* is substituted with the letter *c*).[122] Every word of the Greek text with a distance lower than the threshold is highlighted with the same color of the aligned index entry.[123] Words that are aligned with more than one index entry (because there are four indices containing more or less the same entries) are highlighted with all the colors of the higlighted index entries.

The resource is based on the alignment of Kaibel references that have been automatically generated by the conversion of Casaubon references included in the printed versions of the indices. For example, if we read *Deipn.* 7.124–125 (= 323f–325a), we see that in these two paragraphs Athenaeus cites the following forms corresponding to the names of sixteen authors:[124] 7.124 (Ἐπίχαρμος, Σπεύσιππον, Ἱππώνακτος, Ἐρασίστρατός, Γλαῦκος δ' ὁ Λοκρὸς, Ἀρχέστρατός, Ἀριστοφάνης, Θεόπομπος, Ἄλεξις); 7.125 (Ἀριστοτέλης, Ἐπίχαρμος, Σώφρων, Διοκλῆς, Σπεύσιππος, Τρύφων, Σώφρων).


Figure 5.19. *Digital Athenaeus*: *Index to Text* (Ath., *Deipn.* 7.124)

If we select these two paragraphs in *Index to Text*, we can see interesting results. As far as 7.124 is concerned (fig. 5.19),[125] the indices of Meineke and Olson list nine entries corresponding to the nine authors cited in this paragraph. The index of Kaibel doesn't include the name of Epicharmus, because in the printed edition

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122 Every entry and every Greek word is put in lower case at the beginning of the whole process.

123 The *Levenshtein Distance* is one of the distances included in PHP functions and is defined as the minimal number of characters you have to replace, insert, or delete to transform a string into another one. For my alignment, I have chosen to consider two strings the same if the *Levenshtein Distance* is lower than 2.

124 See p. 306 on the *marginalia* to these paragraphs in the manuscript *Marc. Gr.* 447.

125 See http://www.digitalathenaeus.org/tools/KaibelText/indexTOtext.php?passage=7.124 &T=2. The threshold can be modified by changing the parameter *T* in the GET request of the URL.

the reference to 323f is in a note to 318e, where a very similar quotation of fragment 18 of Epicharmus is cited by Athenaeus.[126] No entries are listed under the *Dialogi Personae* of Kaibel because there are no corresponding forms in the Greek text. Except for the form Ἱππώνακτος, all the other eight forms in the text of 7.124 are aligned with the index entries of Olson, Kaibel, and Meineke. Below the alignment, the web page of *Indext to Text* shows the distances between the entries and the forms of the Greek text with their corresponding URNs that embed a link to the text of the *Deipnosophists* (fig. 5.20).[127] The same page shows also a distinction between *single references* and *multiple references* under each index. This is due to the fact that *Index to Text* is based on URNs generated from Kaibel citations that are the result of the their conversion from Casaubon citations with the *Casaubon-Kaibel Reference Converter*.

As it was explained at p. 324, the different length of Casaubon sections and Kaibel paragraphs generates ambiguities in the conversion. In our example, the entries of Olson about "Alexis of Thurii", "Epicharmus of Syracuse", and "Speusippus of Athens" are labelled as *multiple references* because the automatic conversion of their Casaubon references generates multiple Kaibel paragraphs.[128] This is also the reason why *Index to Text* sometimes shows entries that don't correspond to Greek forms in the aligned paragraph of the *Deipnosophists*. In our example, the entry ARISTOTELES of the *Index Scriptorum* of Kaibel doesn't correspond to a name of 7.124, but to the Greek form Ἀριστοτέλης cited in 7.123.[129]

As far as 7.125 is concerned (fig. 5.21),[130] the indices of Kaibel and Olson list six entries corresponding to the six authors cited in this paragraph. The index of Meineke doesn't include an entry for Speusippus because this passage is missing in the printed edition of the index. Every form of author names of 7.125 is aligned with the index entries of Olson, Kaibel, and Meineke. Also in this case ambiguities are due to ambiguities of references. By clicking on each entry in the web page of *Index to Text*, it is possible to visualize the correspondences between Casaubon and Kaibel citations for each URN through a resource that is an enhanced *Index Digger*: http://www.digitalathenaeus.org/tools/OlsonIndex/superdigger.php.

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126 Ath., *Deipn.* 318e: Ἐπίχαρμος δ᾽ ἐν Ἥβας γάμῳ· πώλυποί τε σηπίαι τε καὶ ποταναὶ τευθίδες χὰ δυσώδης βολβιτὶς γραῖαί τ᾽ ἐριθακώδεες.

127 http://www.digitalathenaeus.org/tools/KaibelText/indexTOtext.php?passage=7.124&T=2

128 For example, *Deipn.* 324c, which is the reference to Alexis of Thurii in the index of Olson, corresponds to Kaibel 7.124 and 7.125 according to the automatic conversion. On the other side, *Deipn.* 324b, which is the reference to Archestratus of Gela in the index of Olson, corresponds to Kaibel 7.124 and this is the reason why this reference is labelled as *single reference*.

129 The form Ἀριστοτέλης is also present in 7.125, but in this case the index entry of Kaibel is unambiguously aligned with it: http://www.digitalathenaeus.org/tools/KaibelText/indexTOtext.php?passage=7.125&T=2.

130 http://www.digitalathenaeus.org/tools/KaibelText/indexTOtext.php?passage=7.125&T=2

**Figure 5.20.** *Digital Athenaeus*: *Index to Text* (Ath., *Deipn.* 7.124)

Figure 5.21. *Digital Athenaeus*: *Index to Text* (Ath., *Deipn.* 7.125)

This resource uses the *Levenshtein Distance* to solve ambiguities of index entries that are generated by the automatic conversion of Casaubon references into Kaibel references. Every index entry is aligned with the passage corresponding to its Kaibel reference and the corresponding URNs are printed if the alignment is detected. This resource is an experimental tool to try to automatically disambiguate Kaibel paragraphs instead of manually voting them.[131]

5.6 Named Entity Recognition

Named Entity Recognition (NER) is a task of information extraction that aims at finding mentions of named entities in the text and classify their types into categories corresponding to proper names and quantities of interest, such as people, places, organizations, time expressions, monetary amounts, percentages, etc. NER is a relatively mature technology in *Natural Language Processing* (NLP) and its goal is to extract semantic content from texts by acquiring structured data from unstructured information.[132] NER is now generating a great interest to scholars working in the digital humanities, as it is demonstrated by the implementation of web-based platforms for the annotation of historical documents like *Perseids* and *Recogito*.[133] Moreover, infrastructure software projects like ANNIS and INCEpTION — that are not associated with any single annotation project — are also used in the digital humanities and for historical languages.[134]

As far as Classical languages are concerned, experiments have been done for Latin and NER is in the agenda of *The Classical Language Toolkit* (CLTK).[135] *Recogito* provides automatic NER tagging for historical documents using *Stanford CoreNLP*, but is still limited to English, French, German and Spanish with beta support for Latin NER.[136] For authority lists of named entities in ancient Greek, we dispose of preliminary and partial data in the online *Lexicon of Greek Personal Names* (LGPN), in the gazetteer *Pleiades*, in the beta version of *Trismegistos People*, and in the project *Standards for Networking Ancient Prosopographies*

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131 On the experimental voting system of the *Digital Athenaeus* project, see p. 325.

132 Bird/Klein et al. (2009) 281–289; Wilcock (2009) 55–62; Burghardt (2014); Nouvel/Ehrmann et al. (2016) 153–156; Ide/Pustejovski (2017) 875–892; Li/Sun et al. (2018); Jurafsky/Martin (2019), ch. 17.

133 See https://www.perseids.org and https://recogito.pelagios.org.

134 See http://corpustools.org/annis and https://inception-project.github.io. For a project on historical languages using ANNIS, see *Coptic SCRIPTORIUM*: http://www.copticscriptorium.org; Almas/Schroeder (2016); Zeldes/Schroeder (2016).

135 Erdmann/Brown et al. (2017); Burns (2019).

136 Simon/Barker et al. (2017).

(SNAP:DRGN).[137] These projects demonstrate that NER for historical data is challenging due to its nature, but also that plays a key role in document comprehension processes and that merits special attention in the context of both Classical Philology and NLP. Moreover, even if linguistic annotations of ancient Greek and Latin texts are growing,[138] high quality annotations of NEs in these languages are still missing.

The *Deipnosophists* of Athenaeus of Naucratis is a rich collection of proper names pertaining to a wide variety of typologies like personal names, peoples, places, groups, languages, festivals, astronomical and meteorological phenomena, chronological data and currencies.[139] Moreover, Athenaeus' work is a huge mine of references to more than 900 authors of Classical literature and their writings, as demonstrated by the data extracted from the indices that have been described in the previous pages. This is the reason why the *Digital Athenaeus* project has been experimenting with NER in order to extract from the *Deipnosophists* names of ancient authors and titles and descriptions of ancient works for starting the creation of a text-based catalog of ancient Greek literature.[140] What we miss is a structured knowledge resource about ancient Greek authors and works with word forms in the original language, corresponding lemmata, contextual annotations, coreferences and relations accompanied by a deep analysis of the language of bibliographic citations in textual sources.

In order to obtain this result, the text of the *Deipnosophists* (ed. Kaibel) has been tokenized, capitalized words have been extracted, and non-relevant entities have been removed.[141] This method works because modern editions of ancient Greek sources generally capitalize words corresponding to proper names and words after a full stop.

In the edition of the *Deipnosophists* by Kaibel, only the first word of the first paragraph of each book has been capitalized for a total of fifteen occurrences, while beginning words of other paragraphs are typed in lower case unless they are proper names. Sometimes Kaibel prints content-related words en-

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137 Depauw/van Beek (2009); Broux/Depauw (2015); Bodard/Gheldof et al. (2016); Bodard/Cayless et al. (2017); Reggiani (2017) 65 ff.

138 Celano (2018); Celano (2019).

139 Braund/Wilkins (2000); Berti/Blackwell et al. (2016). Cf. also below p. 403.

140 Preliminary work has been presented at the *CLARIN Annual Conference 2019* held in Leipzig: Berti (2019d). See also Berti (2021). Data has been also presented and discussed at a conference organized in Trier in November 2020 (*Fragmente einer fragmentierten Welt: Gespräche zur Problematisierung eines traditionellen Begriffes in der modernen klassisch-philologischen Forschung*), whose proceedings are going to be published in the De Gruyter *Transmissions* series, and at the *Digital Classicist Seminar Berlin* in December 2020. Information presented in these pages derive from these publications and discussions.

141 On the use of capitalization as a method for extracting proper names, see Nouvel/Ehrmann et al. (2016) 28 and 80.

tirely in capital letters and they have been identified and removed.[142] The text of the *Deipnosophists* includes 264,750 tokens distributed in 15 books for a total of 1,328 paragraphs and 21,460 sentences. Ca. 23,000 named entities have been extracted. These entities have been lemmatized to query them in external resources for a first disambiguation.[143] The lemmatization has been performed by querying *Morpheus*, *Logeion*, the *Lemmatized Ancient Greek XML*, and the online *Thesaurus Linguae Graecae* (TLG).

Table 5.2. Named Entities in the *Deipnosophists*

NE Class	Semantic sub–classes	Number of occurrences
LOC	*cities, regions, islands, mountains, rivers, etc.*	2,151
LOCderiv	*location_deriv*	4,377
ORG	*festivals and Panhellenic games*	129
ORGderiv	*organization_deriv*	17
OTH	*works, months, constellations, currencies, languages, groups,* etc.	1,916
PER	*gods, persons, personifications, authors, etc.*	14,043
PERderiv	*person_deriv*	291
TOTAL		22,924

As of 2021, the result is the extraction of 22,924 inflected forms of single NEs corresponding to 8,435 unique forms and 4,470 lemmata. Lemmata have been used to query external authority lists to obtain a first provisional set of disambiguated annotations. Annotations of personal and geographical names have been automatically generated by querying lemmata in the online *Lexicon of Greek PersonalNames* (LGPN) (ca. 63% of all NEs) and in the *Pleiades* gazetteer (ca. 17% of all NEs).[144] For the annotation, tags used in computational linguistics have been adopted for labeling generic named entitity types: LOC, LOCderiv, ORG, ORGderiv, OTH, PER, PERderiv (table 5.2).[145] Missing lemmata have been manually added providing a rich set of new lemmatized named entities that are still missing in the above mentioned resources. Data is stored in an SQL database, whose entries can be publicly interrogated in the *Named Entities Digger* and in

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142 An example of a content-related word is the form ΑΛΦΗΣΤΑΙ for a kind of fishes at *Deipn.* 281e. Other tokens that have been removed are the letters Α, Β, Γ and the abbreviation ΠΡ (πρεσβευτής) that are used to refer to speaking characters: see, for example, *Deipn.* 5b, 131a, and 304a.
143 Cf. Nouvel/Ehrmann et al. (2016) 77–78 and 81–83.
144 Berti (2019d) 2.
145 Nouvel/Ehrmann et al. (2016), ch. 3.

the *Named Entities Concordance* of the *Digital Athenaeus* project.[146] Every occurrence of each NE is identified with a CTS URN, as for example Πλάτωνος in *Deipn.* 9.37: `urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:9.37@πλάτωνος[1]`.

Figure 5.22. *Named Entities Digger*: Ἐλπινίκη [Elpinikei]

5.6.1 Named Entities Digger

The *Named Entities Digger* is a tool for digging single Named Entities (NE) into the Greek text of the *Deipnosophists*.[147] The tool is complementary to the *Named Entities Concordance*,[148] is experimental, based on semi-automatic methods and linked to external resources. Results still need further correction, disambiguation, NE relation and coreference resolution.[149] The tool is also complementary to the *Book Stream* and to *Index to Text*, and is linked to the *CTS URN Retriever*.[150] The following search fields allow to search inflected forms and lemmata by typing Ancient Greek in Unicode or by using ASCII transliteration:

– `Word form`: inflected forms (with transliteration) of detected NEs as they appear in the *Deipnosophists* (e.g., Αἰσχύλου [Aischylou])
– `Lemma`: lemmata (with transliteration) of inflected forms of detected NEs of the *Deipnosophists* (e.g., Ἀμφικτύων [Amphiktyon]).

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146 See sections 5.6.1 and 5.6.2.
147 http://www.digitalathenaeus.org/tools/KaibelText/named_entities_digger.php
148 Section 5.6.2.
149 On these concepts, see Nouvel/Ehrmann et al. (2016) 99 ff.
150 Sections 5.4.2, 5.5.5, and 5.5.6.

Output Fields display results and provide scholars with links to external resources in order to get information about the meaning and the function of queried lemmata and inflected forms (fig. 5.22):

- `Lemma`: lemma of inflected forms of detected NEs of the *Deipnosophists* with automatic detection in external resources and authority lists:
  - *Logeion*: e.g., Θάσιος [Thasios];
  - LGPN: e.g., Θησεύς [Theseus] (personal name) or Ἄβυδος [Abydos] (place);
  - *Pleiades*: e.g., Ῥόδος [Rhodos];
  - *Index of Ancient Greek Lexica*: e.g., Σάμος [Samos];
  - VIAF: e.g., Ἴστρος [Istros].
- `Inflected form`: inflected forms of detected NEs as they appear in the *Deipnosophists* with automatic detection in external and internal resources:[151]
  - External resources:
    * TLG (subscription required – individual): e.g., Ἀβδηρίτου [Abderitou];
    * Gulick (annotated EpiDoc XML file of the *Deipnosophists* (ed. Gulick) in the PerseusDL GitHub repository – name types: constellation, ethnic, festival, group, language, month, noclass, person, place, title): e.g., Περγαμηνός [Pergamenos].
  - Internal resources:
    * Search in Kaibel: search every occurrence of detected NEs in the Greek text of the *Deipnosophists* (ed. Kaibel): e.g., Μενάνδρου [Menandrou];
    * CTS urn of each occurrence of detected NEs in the *Deipnosophists* with link to the *CTS URN Retriever* (e.g., `urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:1.16@πρίαμος[1]`);
    * Named Entity Class (still experimental): LOC, LOCderiv, ORG, ORGderiv, OTH, PER, PERderiv;
    * Indices: visualization of index entries (in the original form) corresponding to NEs of the *Deipnosophists* in the following indices (when present and if detected):[152] A. Meineke, *Index Scriptorum*; G. Kaibel, *Index Scriptorum*; S. Douglas Olson, *Index of Authors, Texts, and Persons.*

External resources generate different results. *Logeion* and the *Thesaurus Linguae Graecae* (TLG) give information about the morphology and the meaning of NEs. *Logeion* allows to automatically detect lemmata, while the TLG allows to auto-

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151 For example, Ἐλπινίκη [Elpinikei]: http://www.digitalathenaeus.org/tools/KaibelText/named_entities_digger.php?what=Ἐλπινίκη (fig. 5.22).

152 For example, Ἡρόδοτος [Herodotos]: http://www.digitalathenaeus.org/tools/KaibelText/named_entities_digger.php?what=Ἡρόδοτος. In the case of the indices, an alignment is performed between both the lemma and the inflected form of each named entity and each index entry using Kaibel references expressed in the relevant URN: see p. 394.

matically detect only inflected forms (lemmata can be accessed through inflected forms).[153]

The *Lexicon of Greek Personal Names* (LGPN) and the gazetteer *Pleiades* disambiguate lemmata of personal and place names. In the LGPN, lemmata of personal names can be detected with the ancient Greek form, while places can be detected only in the transliteration.[154] In *Pleiades*, ancient Greek forms of places can be detected and obtained, if available.[155] The *Index of Ancient Greek Lexica* is a resource developed by the DC3 (Duke Collaboratory for Classics Computing) that allows to detect entries in different lexica of ancient Greek.[156] VIAF is the *Virtual International Authority File* that "matches and links widely-used authority files and makes that information available on the Web."[157] For our purposes, VIAF allows to search lemmata in ancient Greek.[158] *Gulick* refers to an EpiDoc XML file of the edition of the *Deipnosophists* by Charles Gulick that includes markup of named entities.[159] The following ten entities are marked up within the TEI element `<name>` and the attribute `@type`:[160] 1) `constellation` (2), 2) `ethnic` (1,241),

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153   On the morphological analysis of ancient Greek in the TLG, see http://stephanus.tlg.uci.edu/history.php (*The Lemmatization Project*) and Packard (1973). On the integration of the DFHG project with *Logeion*, see p. 167. Links to the TLG can be provided depending on an individual or an institutional subscription (http://stephanus.tlg.uci.edu/subscriptions.php). In this case I have chosen the individual subscription and, if users are logged in with an institutional subscription, the resource can't be accessed.

154   For example, http://clas-lgpn2.classics.ox.ac.uk/name/Θησεύς and http://clas-lgpn2.classics.ox.ac.uk/place/Abydos. In terms of automatic detection, there are issues of character encoding. For example, the personal name Ἴστρος is not detectable because in the LGPN the beginning *iota* with smooth breathing and acute accent is represented as a Unicode composing character and not as a precomposed character: cf. Tauber (2019). This is the reason why the LGPN gives as a result only the place name "Istros": http://clas-lgpn2.classics.ox.ac.uk/place/Istros.

155   For example, Ῥόδος [Rhodos]: https://pleiades.stoa.org/places/places/590031. On the integration of the DFHG project with *Pleiades*, see sections 4.4.1.1 and 4.4.2.1.

156   For example, Σάμος [Samos]: https://dcthree.github.io/ancient-greek-lexica-#Σάμος. On this resource, see https://dcthree.github.io/ancient-greek-lexica/. The index allows to search for headwords in Hesychius, Photios, Phrynichus, Harpokration, Stephanus of Byzantium, Moeris, Aelius Dionysius, Apollonius' *Lexicon Homericum*, Orion's *Etymologicum*, Diogenianus' *Paroemiae*, Zenobius, Pseudo-Zonaras, LSJ, *Logeion*, *Wiktionary*, *Words in Progress*, the *Brill Dictionary of Ancient Greek*, the *Suda*, the Lexicon αἱμωδεῖν, the *Etymologicum Genuinum*, the *Etymologicum Magnum*, the *Etymologicum Gudianum*, the Δικῶν Ὀνόματα, the Λέξεις Ῥητορικαί, and the *Synagoge*.

157   On the contribution of *Perseus*, see https://viaf.org/viaf/partnerpages/PERSEUS.html.

158   For example, Ἴστρος [Istros]: http://viaf.org/viaf/search?query=local.namesall'"Ἴστρος" &sortKeys=holdingscount&recordSchema=BriefVIAF.

159   The XML file is available at https://github.com/PerseusDL/canonical-greekLit/blob/master/data/tlg0008/tlg001/tlg0008.tlg001.perseus-grc4.xml On the digital version of the edition of Gulick (1951–1957), see section 5.3.

160   Numbers in round brackets refer to the total numer of occurrences of each entity that have been marked up in the XML file of the *Deipnosophists*.

3) `festival` (14), 4) `group` (352), 5) `language` (6), 6) `month` (7), 7) `noclass` (1,339), 8) `person` (3,461), 9) `place` (2,270), 10) `title` (31). The following lines correspond to the beginning of the *Perseus* XML file of the edition of the *Deipnosophists* by Gulick with the annotation of the above listed entities:[161]

```
1  <pb xml:id="v.1.p.2"/>
2  <div type="edition" n="urn:cts:greekLit:tlg0008.tlg001.perseus-grc4">
3  <div type="textpart" subtype="book" n="1">
4  <div type="textpart" subtype="chapter" n="1">
5  <p> <milestone unit="casaubonpage" xml:id="casaubonpage-1a" n="1a"/> <
      name type="person" key="0017075:*)aqh/naios:person:masc:nom">
      Ἀθήναιος</name> μὲν ὁ τῆς βίβλου πατήρ: ποιεῖται δὲ τὸν λόγον
      πρὸς <name type="person" key="0001023:*timokra/ths:person:masc:acc
      ">Τιμοκράτην</name> <rs type="nomorph">Δειπνοσοφιστὴς</rs> δὲ
      ταύτῃ τὸ ὄνομα. ὑπόκειται δὲ τῷ λόγῳ <name type="person" key="
      0001000:*larh/nsios:person:masc:nom">Λαρήνσιος</name> <name type="
      ethnic" key="0993138:*(rwmai=os:ethnic:masc:nom 0001000:*(rwmai=os
      :group:masc:nom">Ῥωμαῖος</name>, ἀνὴρ τῇ τύχῃ περιφανής, τοὺς
      κατὰ πᾶσαν παιδείαν ἐμπειροτάτους ἐν τοῖς αὐτοῦ δαιτυμόνας
      ποιούμενος: ἐν οἷς οὐκ ἔσθ᾿ οὗτινος τῶν καλλίστων οὐκ
      ἐμνημόνευσεν. ἰχθῦς τε γὰρ τῇ βίβλῳ ἐνέθετο καὶ τὰς τούτων χρείας
      καὶ τὰς τῶν ὀνομάτων ἀναπτύξεις, καὶ λαχάνων γένη παντοῖα. <
      milestone unit="casaubonpage" xml:id="casaubonpage-1b" n="1b"/>
      καὶ ζῴων παντοδαπῶν, καὶ ἄνδρας ἱστορίας συγγεγραφότας καὶ
      ποιητὰς καὶ φιλοσόφους, καὶ ὄργανα μουσικὰ καὶ σκωμμάτων εἴδη
      μυρία: καὶ ἐκπωμάτων διαφορὰς καὶ πλούτους βασιλέων διηγήσατο,
      καὶ νηῶν μεγέθη, καὶ ὅσα ἄλλα οὐδ᾿ ἂν εὐχερῶς ἀπομνημονεύσαιμι, ἢ
      ἐπιλίποι ἂν με ἡ ἡμέρα κατ᾿ εἶδος διεξερχόμενον. καί ἐστιν ἡ τοῦ
      λόγου οἰκονομία μίμημα τῆς τοῦ δείπνου πολυτελείας, καὶ ἡ τῆς
      βίβλου διασκευὴ τῆς ἐν τῷ δείπνῳ <pb xml:id="v.1.p.4"/>
      παρασκευῆς. τοιοῦτον ὁ θαυμαστὸς οὗτος τοῦ λόγου οἰκόνομος <name
      type="person" key="0017075:*)aqh/naios:person:masc:nom">Ἀθήναιος</
      name> ἥδιστον λογόδειπνον εἰσηγεῖται κρείττων τε αὐτὸς ἑαυτοῦ
      γινόμενος, ὥσπερ οἱ <name type="place" key="0361602:*)aqh=nai:
      place:nn:dat 0000001:*)aqh/neus:noclass:masc:dat">Ἀθήνησι</name>
      ῥήτορες, ὑπὸ τῆς ἐν τῷ λέγειν <milestone unit="casaubonpage" xml:
      id="casaubonpage-1c" n="1c"/>θερμότητος πρὸς τὰ ἐπόμενα τῆς
      βίβλου βαθμηδὸν ὑπεράλλεται.</p>
```

Thanks to the extraction of marked up entities from the *Perseus* XML file, the *Named Entities Digger* is able to add information deriving from the attribute `@type` about inflected forms of NEs in the *Deipnosophists*.[162]

Internal resources connected to the *Named Entities Digger* allow scholars to visualize each named entity in the context of the *Deipnosophists* through the

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161 The lemma is in Beta Code with morphological information. Due to lack of documentation, it is not possible to get information and meaning of ciphers in the attribute `@key`.

162 For example, Περγαμηνός [Pergamenos] (*ethnic* in Gulick): http://www.digitalathenaeus .org/tools/KaibelText/named_entities_digger.php?what=Περγαμηνός.

Search function[163] and to obtain a CTS URN of each occurrence through the *CTS URN Retriever*.[164] Named Entity classes (LOC, LOCderiv, ORG, ORGderiv, OTH, PER, PERderiv) are a first form of disambiguation according to standards of computational linguistics that will be further specified with subclasses.[165] Finally, the connection with the indices of the *Digital Athenaeus* allows to see if detected named entities are present in the indices of Meineke, Kaibel, and Olson and how they have been annotated by these scholars.

5.6.2 Named Entities Concordance

The *Named Entities Concordance* is a tool for finding concordances of single Named Entities (NE) in the Greek text of the *Deipnosophists* (ed. Kaibel).[166] The tool is complementary to the *Named Entities Digger*.[167] The following search fields allow to search inflected forms and lemmata by typing ancient Greek in Unicode or by using ASCII transliteration:
- `Word form`: inflected forms (with transliteration) of detected NEs as they appear in the *Deipnosophists* (e.g., Πλάτωνος [Platonos] and Φιλόχορος [Philochoros]) (figg. 5.23 and 5.24);[168]
- `Lemma`: lemmata (with transliteration) of inflected forms of detected NEs of the *Deipnosophists* (e.g., Ἀριστοφάνης [Aristophanes]) (fig. 5.25).[169]

Output fields show results of the requested inflected form or lemma and the output visualizes each occurrence in the immediate context, where the requested entity is **red** and other NEs in the immediate context are **blue-green** and linkable (figg. 5.23, 5.25, and 5.24):
- `Lemma`:
  - automatic detection of lemmata in *Logeion*.
- `Inflected form`:
  - search in Kaibel: search every occurrence of detected NEs in the Greek text of the *Deipnosophists* (ed. Kaibel);

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163 For example, http://www.digitalathenaeus.org/tools/KaibelText/search.php?what= Μενάνδρου&method=diacritics.

164 For example, http://www.digitalathenaeus.org/tools/KaibelText/cts_urn_retriever.php?U RN=urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:1.16@πρίαμος[1].

165 Berti (2019d).

166 http://www.digitalathenaeus.org/tools/KaibelText/named_entities_concordance.php

167 See section 5.6.1.

168 See http://www.digitalathenaeus.org/tools/KaibelText/named_entities_concordance.p hp?what=Πλάτωνος and http://www.digitalathenaeus.org/tools/KaibelText/named_entit ies_concordance.php?what=Φιλόχορος.

169 http://www.digitalathenaeus.org/tools/KaibelText/named_entities_concordance.php?w hat=Ἀριστοφάνης|lemma

- automatic detection of inflected forms in the TLG (subscription required – individual);
- Named Entity Class (still experimental: LOC, LOCderiv, ORG, ORGderiv, OTH, PER, PERderiv); visualization of other named entities in the immediate context of each searched named entity (with NE Class on mouseover).

Πλάτωνος [Platonos]   Submit

Lemma: **Πλάτων [Platon]**
lemma in LOGEION

Inflected form: **Πλάτωνος [Platonos]** - search in Kaibel
inflected form in TLG
Named Entity Class: PER

1.7 [	ἀγνοεῖ δ' ὅτι οἱ ἐν τῷ Πλάτων συσσιτίῳ ὀκτὼ καὶ εἴκοσι ἦσαν. οὗτοι]
2.73 [	Ὠφελίων· Λιβυκόν πέπερι θυμίαμα καὶ βιβλίον Πλάτων ἐμβρόντητον. Νίκανδρος Θηριακοῖς· ἢ καὶ λεπτοθρίοιο]
3.52 [	ἐπινωπίδα καλῶν· καὶ εἰ μὲν τὴν Πλάτων ζηλώσας, μαθεῖν βουλόμεθα ....· εἰ δὲ]
5.12 [	ἐστὶν ἄγυρις ἀλλήλους ἐπαινούντων, τὸ δὲ Πλάτων πλῆρές ἐστιν μυκτηριστῶν ἀλλήλους τυθαζόντων· τὸν]
5.12 [	νεανίσκων πάρεστι σκοπεῖν ἐξ αὐτοῦ τοῦ Πλάτων, τὸν μὲν γὰρ Ἀλκιβιάδην φησὶν ἐν]
5.18 [	εἴην, τοῦτ' αἴτημί σε. τὸ δὲ Πλάτων συμπόσιον οὐ συνέδριόν ἐστιν, οὐ βουλευτήριον,]
5.55 [	ποῦ Θουκυδίδης τὸν Σωκράτη παρενέχρωσε ὑπὸ Πλάτων στρατιώτην; τί γὰρ ἀσπίδι ξύνθημα καὶ]
5.55 [	δόντος, ὡς ἡμεῖς ἀκούομεν. ὁ δὲ Πλάτων Σωκράτης εἰς Ποτίδαιαν λέγει παρεῖναι καὶ]
5.56 [	εἴρηκεν Παυσανίας ἔξεστι μαθεῖν ἐκ τοῦ Πλάτων Συμποσίου. Παυσανίου γὰρ οὐκ οἶδα σύγγραμμα,]
5.56 [	τοῦτο Ξενοφῶν εἴτ' ἄλλως γεγραμμένῳ τῷ Πλάτων ἐνέτυχε Συμποσίῳ, παρείσθω· τὸ δὲ κατὰ]
5.57 [	δεύτερος. ἀπὸ δὲ Ἀπολλοδώρου καὶ τῆς Πλάτων γενέσεως τεσσαρεσκαιδεκάτος ἐστὶν ἄρχων Εὔφημος, ἐφ']
7.10 [	δὲ τούτων ἦν καὶ Σπεύσιππος ὁ Πλάτων ἀκουστὴς καὶ συγγενής· Διονύσιος γοῦν ὁ]
8.30 [	γράφει δὲ οὕτως ὁ Δελφός· Ἀρίστιππος Πλάτων ἐπιτιμήσαντος αὐτῷ διότι πολλοὺς ἰχθῦς ἠγόρασε,]
8.30 [	δυεῖν ὀβολοῖν ἔφησεν ἐωνῆσθαι. τοῦ δὲ Πλάτων εἰπόντος διότι καὶ αὐτὸς ἂν ἠγόρασα]
8.33 [	Μυννίσκος ὁ τραγικὸς ὑποκριτὴς κωμῳδεῖται ὑπὸ Πλάτων ἐν Σύρφακι ὡς ὀψοφάγος οὕτως· ὁδὶ]
8.50 [	τὸ φαρμακοπωλεῖν ἦλθεν· εἶτα ἀναπεπταμένου τοῦ Πλάτων περιπάτου, φησί, παραβαλὼν ἑαυτὸν προσεκάθισε τοῖς]
9.28 [	πλούτου καὶ τρυφῆς τοὺς τοῦ θαυμασιωτάτο Πλάτων διαλόγους ἠγάγνεψεν ἐκμανθάνοντας τοὺς μαγείρους φέροντάς]
9.37 [	γὰρ ὁ Λεωγόρας ὡς γαστρίμαργος ὑπὸ Πλάτων ἐν Περιαλγεῖ Μνησίμαχος δ' ἐν Φιλίππῳ]
9.48 [	τῷ ἐπιγραφομένῳ περὶ τῶν ἐν τῇ Πλάτων Πολιτείᾳ μαθηματικῶς εἰρημένων γράφων οὕτως· οἱ]
10.14 [	πολυτελῶν καὶ στρατηγικῶν δείπνων παραληφθεὶς ὑπὸ Πλάτων εἰς τό ἐν Ἀκαδημείᾳ συμπόσιον καὶ]
11.112 [	ἀντικρυς φάσκων ὁ πολυμαθέστατος Ἀριστοτέλης πρὸ Πλάτων διαλόγους γεγραφέναι τὸν Ἀλεξαμενόν, διαβάλλει δὲ]
11.113 [	Δελφοῖς ἑαυτοῦ χρυσῆς εἰκόνος, εἰπόντος τοῦ Πλάτων, ὅτε εἶδεν αὐτόν, ἦκει ἡμῖν ὁ]
11.113 [	φασιν ὡς ἀναγνοὺς ὁ Γοργίας τὸν Πλάτων διάλογον πρὸς τοὺς παρόντας εἶπεν ὅτι]
11.113 [	τούτων οὔτ' εἶπέν οὔτ' ἤκουσε παρὰ Πλάτων, ταῦτά φασι καὶ Φαίδωνα εἰπεῖν ἀναγνόντα]

Figure 5.23. *Named Entities Concordance*: Πλάτωνος [Platonos]

This dynamic concordance visualizes the function of each named entity in the context and focuses on the language of bibliographic references, going beyond the limits of a traditional sequential reading approach. For example, the extraction of the occurrences of the name Ἀριστοφάνης in the *Deipnosophists* immediately reveals the citations of three homonymous authors: the comic poet (`tlg0019`), the historian from Boeotia (`tlg1196`), and the Byzantine grammarian (`tlg0644`). Citations in their context show when and how these authors are referred to and if they are accompanied by expressions related to their literary activity (γραμματικός, κωμικός, etc.) and their works. For example, the form Πλοῦτος in the *Deipnosophists* is not only the title of a comedy by Aristophanes (that Athenaeus distinguishes between a first and a second edition), but also the title of works by Epicharmus (`tlg0521`) and Nicostratus (`tlg0484`).[170]

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170 See the results by searching Πλούτῳ [Ploutoi]: http://www.digitalathenaeus.org/tools/Kai belText/named_entities_concordance.php?what=Πλούτῳ.

Φιλόχορος [Philochoros]   Submit

Lemma: **Φιλόχορος [Philochoros]**
  lemma in LOGEION

  Inflected form: **Φιλόχορος [Philochoros]** - search in Kaibel
    inflected form in TLG
    Named Entity Class: PER

1 . 16 [	νενομισμένα· ἀρνῶν ἠδ' ἐρίφων ἐπιδήμιοι ἁρπακτῆρες.	Φιλόχορος δὲ ἱστορεῖ καὶ κεκωλῦσθαι Ἀθήνησιν ἀπέκτου	]
2 . 6 [		Φιλόχορος δέ φησιν ὅτι οἱ πίνοντες οὐ	]
2 . 7 [		Φιλόχορος δέ φησιν Ἀμφικτύονα τὸν Ἀθηναίων βασιλέα	]
4 . 65 [	Ἀρεοπαγῖται καὶ ἐκόλαζον, ἱστόρησαν Φανόδημος καὶ	Φιλόχορος ἄλλοι τε πλείους. Μενέδημον γοῦν καὶ	]
5 . 15 [	καὶ ἱεροί τινες αὐλῶνες, ὧν μέμνηται	Φιλόχορος ἐν τῇ ἐνάτῃ καλοῦσι δ' ἀρσενικὰς	]
5 . 58 [	μ', Ἱερώνυμος κη', Μαρσύας δὲ καὶ	Φιλόχορος κγ'. τούτων οὖν διαφόρως ἱστορουμένων λάβωμεν	]
6 . 27 [	τοῦτο παρασίτιον προσηγορεύετο. ταῦτα ἱστορεῖ καὶ	Φιλόχορος ἐν τῇ ἐπιγραφομένῃ Τετραπόλει μνημονεύων τῶν	]
6 . 46 [	ἔξεστιν ἐστιῶν τύχη, ἐλθών ... καὶ	Φιλόχορος δ' ἐν ἑβδόμῃ Ἀτθίδος οἱ γυναικονόμοι,	]
9 . 17 [	τινα ἐκλιπόντων τῶν βοῶν, φησὶν ὁ	Φιλόχορος, νομοθετηθῆναι διὰ τὴν σπάνιν ἀπέχεσθαι αὐτοὺς	]
9 . 49 [	ἐν Ὀρνιθογονίᾳ ἢ Βοιῶ, ὡς φησι	Φιλόχορος, ὑπὸ Ἄρεως τὸν Κύκνον ὀρνιθωθῆναι καὶ	]
11 . 13 [	ὑποπίνωμεν. λέγει δὲ περὶ τούτων ὁ	Φιλόχορος οὑτωσί· Ἀθηναῖοι τοῖς Διονυσιακοῖς ἀγῶσι τὸ	]
11 . 92 [	ΠΕΝΤΑΠΛΟΑ. μνημονεύει αὐτῆς	Φιλόχορος ἐν δευτέρᾳ Ἀτθίδος Ἀριστόδημος δ' ἐν	]
14 . 24 [	θεῶν λόγος ἀποσεμνύνει τὸν ἑκάστων τρόπον.	Φιλόχορος δέ φησιν ὡς οἱ παλαιοὶ σπένδοντες	]
14 . 29 [Τυρταίου	ποιήματα ἀπομνημονεύοντες ἐρρυθμον κίνησιν ποιοῦνται.	Φιλόχορος δέ φησιν κρατήσαντας Λακεδαιμονίους Μεσσηνίων διὰ	]
14 . 42 [	γενόμενον κατὰ Ἀρχίλοχον, κατοικήσαντα ἐν Κορκύρᾳ.	Φιλόχορος δ' ἐν γ' Ἀτθίδος Λύσανδρος, φησίν,	]
14 . 53 [	μνημονεύει αὐτοῦ καὶ Δίφιλος ἐν Σκάτῃ	Φιλόχορος δ' ἀμφιφῶντα αὐτὸν κληθῆναι καὶ εἰς	]
14 . 59 [	ὀγδόῳ Πολιτικῶν Νόμων, τὴν Πολιτείαν ἐπιγραφομένην·	Φιλόχορος ἐν τοῖς περὶ Μαντικῆς Ἀξιόπιστον	]
14 . 72 [	ἢ προσφέρων. Ἀθηναῖοι δ', ὡς φησι	Φιλόχορος, ταῖς Ὥραις θύοντες οὐκ ὀπτῶσιν, ἀλλ'	]
15 . 48 [	ἐξ αὐτοῦ τὰ καλὰ καὶ χρήσιμα.	Φιλόχορος δ' ἐν δευτέρῳ Ἀτθίδος καὶ θέσμιον,	]
15 . 52 [	ἐπ' Ἀντιγόνῳ δὲ καὶ Δημητρίῳ φησὶν	Φιλόχορος Ἀθηναίους ᾄδειν παιᾶνας τοὺς πεποιημένους ὑπὸ	]

Figure 5.24. *Named Entities Concordance*: Φιλόχορος [Philochoros]

Ἀριστοφάνης [Aristophanes] (lemma)   Submit

Lemma: **Αριστοφάνης [Aristophanes]**
  lemma in LOGEION

  Inflected form: **Αριστοφάνει [Aristophanei]** - search in Kaibel
    inflected form in TLG
    Named Entity Class: PER

11 . 3 [	οὕτως ἡ τῶν ποτηρίων σκευοθήκη παρ'	Ἀριστοφάνει μὲν ἐν Γεωργοῖς· ὥσπερ κυλικείου τοὔθόνιον	]

  Inflected form: **Αριστοφάνη [Aristophane]** - search in Kaibel
    inflected form in TLG
    Named Entity Class: PER

5 . 3 [	τὸν μὲν Ἐρυξίμαχον ἰατρόν, τὸν δὲ	Ἀριστοφάνη ποιητήν, ἄλλον δ' ἀπ' ἄλλης προαιρέσεως	]
5 . 18 [	δύο νυστάζειν, καταδαρθεῖν δὲ πρότερον τὸν	Ἀριστοφάνη, ἤδη δὲ ἡμέρας ὑποφαινούσης τὸν Ἀγάθωνα·	]
9 . 2 [	ἐν τοῖς περὶ τῆς Ἀττικῆς λέξεως	Ἀριστοφάνη παριστᾷ λέγοντα· κάβλεπε σίναπυ καὶ τὰ	]
9 . 58 [	ἔχαιρον ἔχων ἐχεγγυώτατον μάρτυρα τὸν χαρίεντα	Ἀριστοφάνη. ἅμα δὲ ταῦτα λέγοντος αὐτοῦ εἰσῆλθέ	]
11 . 41 [	γεγονὼς τοῖς χρόνοις κατὰ τὸν κωμικὸν	Ἀριστοφάνη, μνημονεύει δὲ τῆς κύλικος Θεόπομπος μὲν	]

  Inflected form: **Αριστοφάνην [Aristophanen]** - search in Kaibel
    inflected form in TLG
    Named Entity Class: PER

3 . 11 [	φησιν κοδώνεα ὑπὸ Ἀχαιῶν, τοῦτο λέγων	Ἀριστοφάνην εἰρηκέναι ἐν Λακωνικαῖς Γλώσσαις κοράκεων δὲ	]
14 . 39 [	τινα ἀποτελεῖν τοῖς ὀρχουμένοις, καθάπερ καὶ	Ἀριστοφάνην ἐν Βατράχοις φάναι	]
14 . 67 [	ἰσχάδες — ὄντως γὰρ κατὰ τὸν	Ἀριστοφάνην οὐδὲν γὰρ ὄντως γλυκύτερον τῶν ἰσχάδων	]

  Inflected form: **Αριστοφάνης [Aristophanes]** - search in Kaibel
    inflected form in TLG
    Named Entity Class: PER

|			
1 . 6 [εὐσταθεῖς,	οὐκ ἐγχειρογάστορας. γυργάθους ψηφισμάτων φέροντες,	Ἀριστοφάνης φησίν.	]
1 . 39 [	γοῦν μετὰ τοῦ εἰκότος τὰ δράματα.	Ἀριστοφάνης γοῦν (παρὰ δὲ τοῖς κωμικοῖς ἡ	]
1 . 55 [	σκληρὸς καὶ δύναμιν ἔχων διαφέρουσαν· οἶμ	Ἀριστοφάνης οὐχ ἥδεσθαι Ἀθηναίους φησὶ λέγων τὸν	]
2 . 15 [	ἐν Βοιωτίᾳ ἡ Τιλφῶσσα· ἀφ' ἧς	Ἀριστοφάνης φησὶ Τειρεσίαν πιόντα διὰ γῆρας οὐχ	]
2 . 30 [	καὶ λούμενος μύροις ψακαστοῖς, ἀφησὶν Ἔφιππος	Ἀριστοφάνης ὅστις ἐν ἡδυόσμοις στρώμασι παννυχίζων τὴν	]
2 . 32 [	τοίνυν ποτ' ἦν, αἴνιγμά τοι νοεῖς.	Ἀριστοφάνης τράπεζαν ἡμῖν εἰσφερε τρεῖς πόδας ἔχουσαν,	]
2 . 35 [	ἑπτὰ τοῦ καρποῦ φαγὼν κεφαλαλγὴς γίνεται.	Ἀριστοφάνης ἐν τοῖς ὄρεσιν δ' αὐτομάτοισιν τὰ	]
2 . 40 [	ἀπολεῖς με, ναὶ μὰ τὴν ἀμυγδαλῆν.	Ἀριστοφάνης ἄγε νυν τὰς ἀμυγδαλᾶς λαβὼν ταοδὶ	]
2 . 47 [	εὐστομαχωτέρας εἶναι. μνημονεύει τῶν θλαστῶν ἐλαιῶν	Ἀριστοφάνης θλαστὰς ποιεῖν ἐλαίας. πάλιν· οὐ ταύτόν	]
2 . 48 [	δ' οὕτω τὰς ῥαφανῖδας εἴρηκε δῆλον	Ἀριστοφάνης ποιεῖ περὶ τῆς τοιαύτης ἀρχαιότητος ἐν	]

Figure 5.25. *Named Entities Concordance*: Ἀριστοφάνης [Aristophanes]

5.6.3 Named Entities Annotation

Pre-annotated data described in section 5.6 has been imported into INCEpTION, which is a web-based platform for semantic text annotation.[171] The INCEpTION platform reuses parts of WebAnno, which is a text annotation tool that was originally developed for the CLARIN community but that is now mainly maintained as part of the INCEpTION project.[172] INCEpTION combines WebAnno with new functionalities such as the knowledge management, search, and more. Both tools support a wide range of text annotation tasks including NE annotation. Moreover, INCEpTION supports interactive and semantic annotation, as for example concept linking, fact linking, and knowledge base population.[173]

In the *Digital Athenaeus* project, INCEpTION is currently used to visualize, correct, and nest annotations of single ancient Greek NEs that have been semi-automatically extracted with the method described in section 5.6. Data has been imported into INCEpTION as TSV files generated according to the WebAnno TSV 3.2 file format.[174] Each file includes the text of single paragraphs of the *Deipnosophists* with sentences split in separate lines.[175] Figure 5.26 shows how pre-annotated data is stored in a TSV file, where each sentence and each token has a number and where entities are annotated with a NamedEntity layer and a Lemma layer. Each entity is also provided with a CTS URN. Figure 5.27 shows how this data is visualized in INCEpTION in separate numbered lines, where single entities have colored labels corresponding to the two layers NamedEntity and Lemma.

A layer called Catalog has been created in INCEpTION to annotate NEs that correspond to names of ancient authors and to descriptions/titles of ancient works, in order to disambiguate these entities and produce a text-based catalog of Greek literature with annotations of ancient Greek inflected forms and their corresponding lemmata. Figure 5.28 shows the Catalog layer, whose values correspond to CTS URNs that uniquely identify authors and works.[176]

Individual entities have been linked together in spans corresponding to real entities, as for example Ἀρχέστρατος ὁ Συρακούσιος ἢ Γελῷος (Archestratus from

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171 See https://inception-project.github.io/ and Klie/Bugert et al. (2018). On the annotation of the *Deipnosophists* in INCEpTION, see https://inception-project.github.io/use-cases/digital-athenaeus/ and Berti (2019d).

172 See https://webanno.github.io/webanno/ and Eckart de Castilho/Mújdricza-Maydt et al. (2016). For a recent review of WebAnno, see Neves/Ševa (2021).

173 More information is available in the documentation of the project: https://inception-project.github.io/documentation/.

174 https://webanno.github.io/webanno/releases/3.5.5/docs/user-guide.html#sect_webannotsv

175 Sentence splitting has been performed on the basis of punctuation marks in ancient Greek: full stop (.), upper stop (·), and question mark (;).

176 Cf. Berti/Blackwell et al. (2016).

```
#FORMAT=WebAnno TSV 3.2
#T_SP=de.tudarmstadt.ukp.dkpro.core.api.ner.type.NamedEntity|identifier|value
#T_SP=de.tudarmstadt.ukp.dkpro.core.api.segmentation.type.Lemma|value
#T_SP=webanno.custom.AncientGreekCatalog|value


#Text=ὅτι Ἀρχέστρατος ὁ Συρακούσιος ἢ Γελῷος ἐν τῇ ὡς Χρύσιππος ἐπιγράφει Γαστρονομία, ὡς
δὲ Λυγκεὺς καὶ Καλλίμαχος Ἡδυπαθεία, ὡς δὲ Κλέαρχος Δειπνολογία, ὡς δ᾽ ἄλλοι Ὀψοποιία —
ἐπικὸν δὲ τὸ ποίημα, οὗ ἡ ἀρχή·
1-1  0-3    ὅτι      _   _   _   _
1-2  4-15   Ἀρχέστρατος *   PER Ἀρχέστρατος urn:cts:greekLit:tlg1175[1]
1-3  16-17  ὁ        _   _   _   urn:cts:greekLit:tlg1175[1]
1-4  18-29  Συρακούσιος *   LOCderiv    Συρακούσιος urn:cts:greekLit:tlg1175[1]
1-5  30-31  ἢ        _   _   _   urn:cts:greekLit:tlg1175[1]
1-6  32-38  Γελῷος   *   LOCderiv    Γελῷος  urn:cts:greekLit:tlg1175[1]
1-7  39-41  ἐν       _   _   _   _
1-8  42-44  τῇ       _   _   _   _
1-9  45-47  ὡς       _   _   _   _
1-10 48-57  Χρύσιππος *   PER Χρύσιππος    urn:cts:greekLit:tlg1264
1-11 58-67  ἐπιγράφει _  _   _   _
1-12 68-79  Γαστρονομία *   OTH γαστρονομία urn:cts:greekLit:tlg1175.tlg001
1-13 79-80  ,        _   _   _   _
1-14 81-83  ὡς       _   _   _   _
1-15 84-86  δὲ       _   _   _   _
1-16 87-94  Λυγκεὺς  *   PER Λυγκεύς urn:cts:greekLit:tlg0471
1-17 95-98  καὶ      _   _   _   _
1-18 99-109 Καλλίμαχος *   PER Καλλίμαχος   urn:cts:greekLit:tlg0533
1-19 110-119 Ἡδυπαθεία *   OTH ἡδυπάθεια    urn:cts:greekLit:tlg1175.tlg001
1-20 119-120 ,       _   _   _   _
1-21 121-123 ὡς      _   _   _   _
1-22 124-126 δὲ      _   _   _   _
1-23 127-135 Κλέαρχος *   PER Κλέαρχος urn:cts:greekLit:tlg1270
1-24 136-147 Δειπνολογία *   OTH δειπνολογία urn:cts:greekLit:tlg1175.tlg001
1-25 147-148 ,       _   _   _   _
1-26 149-151 ὡς      _   _   _   _
1-27 152-154 δ᾽      _   _   _   _
1-28 155-160 ἄλλοι   _   _   _   _
1-29 161-169 Ὀψοποιία *   OTH ὀψοποιία urn:cts:greekLit:tlg1175.tlg001
1-30 170-171 —       _   _   _   _
1-31 172-178 ἐπικὸν  _   _   _   _
1-32 179-181 δὲ      _   _   _   _
1-33 182-184 τὸ      _   _   _   _
1-34 185-191 ποίημα  _   _   _   _
1-35 191-192 ,       _   _   _   _
1-36 193-195 οὗ      _   _   _   _
1-37 196-197 ἡ       _   _   _   _
1-38 198-202 ἀρχή    _   _   _   _
1-39 202-203 ·       _   _   _   _
```

Figure 5.26. WebAnno: TSV 3.2 file format (Ath., *Deipn.* 1.7)

Syracuse or Gela), who is citable as urn:cts:greekLit:tlg1175. In the same line, different forms of the title of Archestratus' work are identified with a CTS URN that also includes the reference to the author through the TLG four-digit number tlg1175: urn:cts:greekLit:tlg1175.ath001.[177]

In the annotations, the TLG three-digit numbers used for works have been experimentally substituted with the string ath### because TLG numbers are associated with the editions of the texts published in the corpus of the TLG. I use the string ath### to express the fact that I'm annotating the text of Athenaeus and, in theory, the editions used by him when composing the *Deipnosophists*.[178] INCEpTION allows also to ingest data from the Wikidata knowledge base, which acts as central storage for the structured data of its Wikimedia sister projects including Wikipedia, Wikivoyage, Wiktionary, Wikisource, and others. In this case, the Wikidata item Q210507 identifies Archestratus and its label is included in the catalog layer.[179]

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177 The four forms are: Γαστρονομία, Ἡδυπάθεια, Δειπνολογία, and Ὀψοποιΐα. On the titles of the work of Archestratus, see p. 109 n. 26.

178 Cf. Berti/Blackwell et al. (2016). This method has a computational and philological purpose, but it's certainly not a way to bypass the well known questions concerning the sources used by Athenaeus. On TLG three-digit numbers, see p. 19 n. 55.

179 https://www.wikidata.org/wiki/Q210507

Figure 5.27. INCEpTION: pre-annotated data (Ath., *Deipn.* 1.7)

Figure 5.28. INCEpTION 0.19: catalog layer (Ath., *Deipn.* 1.7)

As part of a DFG-funded project, work is currently focused on standardize lemmata, check annotations, correct inconsistencies, include complete NEs disambiguation and linking, and perform coreference resolution with a focus on entities related to ancient Greek authors and works.[180] Lemmatized and annotated entities include names of authors (e.g., Θουκυδίδης and Ἀντισθένης ὁ Σωκρατικός) and words belonging to ancient titles or to descriptions of ancient works (e.g., ἐν τῷ περὶ Ἀττικῶν Ὀνομάτων ἢ Γλωσσῶν and Πλούτῳ δευτέρῳ). These forms that have been annotated and revised with generic tags need to be further specified according to their function in the *Deipnosophists*. For example, Θουκυδίδης in the text of Athenaeus is not only a personal name [PER], but also the name of an ancient author; Ἡρακλῆς is not only the name of a god [PER], but also the title of different works.

In order to follow current practices in *Linked Open Data* (LOD), semantic subtypes for domain-specific named entities will be defined according to the *Functional Requirements for Bibliographic Records entity-relationship model* (FRBR), which is also a reference standard of the *Perseus Catalog* and of the *CITE Architecture*.[181] Semantic subtypes will cover the variety of words used by Athenaeus to refer to authors, works, and editions. Tags and semantic subtypes will be part of a tagset that will be uploaded into INCEpTION to visualize and correct data.

Considering the characteristics of bibliographic references in the *Deipnosophists*, this part of the work will allow to produce and export a tagset that can be used to annotate bibliographic entities in other works of ancient Greek literature. The project will then disambiguate and extract bibliographic references from revised entities. Single entities will be linked together in spans corresponding to real entities, such as author names (e.g., Ἴστρος ὁ Καλλιμάχειος) and work titles (e.g., Λακεδαιμονίων Πολιτεία). Tags will be further specified according to the BIO and BILOU annotation formats for multi-token entities.[182]

These tags will be nested with semantic subtypes. Disambiguation and extraction will also capture parts of real entities not yet annotated, as for example the lower-case title συμπόσιον in the expression τὸ δὲ Πλάτωνος συμπόσιον. Transliterated lemmata will be aligned with entries of the *indices scriptorum* of the *Digital Athenaeus* project and with entries extracted from the TLG *Canon* and from the *Perseus Catalog*. Missing entities will be manually added. Given that we don't have bibliographic authority lists in ancient Greek, but only catalogs in Latin or in modern languages, the work for disambiguating and extracting named entities will be performed semi-automatically. The lemmatization will allow to query lemmata of named entities in external resources to generate provisional

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180 See p. 308 n. 11.
181 Babeu (2012); Babeu (2019); Blackwell/Smith (2019).
182 On these formats, see Nouvel/Ehrmann et al. (2016) 151-152.

results. Ancient Greek lemmata will be queried in *Logeion*, VIAF, *DBPedia* and *Wikidata*, in order to find author names of ancient Greek writers that will be further disambiguated with a contextual analysis in the text of the *Deipnosophists* to distinguish, for example, Πλάτων the philosopher and Πλάτων the comic poet. These resources are very useful, because they provide a structured knowledge resource and are importing author names in ancient Greek, that are usually missing in traditional catalogs and indices where these names are expressed in Latin or in other modern languages.

Provisionally annotated data will be uploaded into INCEpTION for visualization, query, correction, active learning and concept linking. INCEpTION will also help perform coreference resolution for solving coreferences in order to identify and relate different references to the same entity like names, descriptions, and pronouns. For example, Ἴστρος and Ἴστρος ὁ Καλλιμάχειος in the *Deipnosophists* refer to same entity "Ister Cyrenaeus".[183] Another example is the adjective γραμματικός to be referred to Ἀριστοφάνης in order to disambiguate the grammarian from other homonymous authors cited by Athenaeus.[184] This work will produce a knowledge base in INCEpTION for linking entity mentions to a structured vocabulary for ancient Greek authors and works that can be used to annotate other texts. As mentioned before, remote knowledge bases like *DBPedia* and *Wikidata* will be also used in INCEpTION to link annotations with external resources.[185]

Every occurrence of each named entity will be assigned unique identifiers in the form of CTS and CITE urns. For example, the word form Ἑλλάνικον in *Deipn.* 11.6 will be identified as `urn:cts:greekLit:tlg0008.tlg001.perseusgrc2:11.6@Ἑλλάνικον[1]`, which means that this is the first occurrence of the word Ἑλλάνικον in this paragraph of Athenaeus' work. This instance of the name Hellanicus will be also assigned `urn:cite:perseus:author.701`, which is the identifier of the author Hellanicus of Lesbos in the *Perseus Catalog*.[186]

URNs will also identify works and multi-token entities. For example, Λυσιστράτη in *Deipn.* 3.39 will be assigned both `urn:cts:greekLit:tlg0008.tlg001.perseus-grc2:3.39@Λυσιστράτη[1]` and `urn:cts:greekLit:tlg0019.tlg007`, which is the identifier of Aristophanes' *Lysistrata* in the *Perseus Catalog*.[187] Ἴστρον τὸν Καλλιμάχειον in *Deipn.* 9.38 will be identified both as `urn:cts:greekLit:tlg0008.tlg001.perseus-`

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183 The homonymous river Ἴστρος will not be considered here because already disambiguated.
184 See p. 406.
185 Boullosa/Eckart de Castilho et al. (2018); Eckart de Castilho/Klie et al. (2018); Klie/Bugert et al. (2018).
186 https://catalog.perseus.org/catalog/urn:cite:perseus:author.701
187 See https://catalog.perseus.org/catalog/urn:cts:greekLit:tlg0019.tlg007. On the experimental string ath### to cite works, see p. 409.

`grc2:9.38@Ἴστρον[1]–Καλλιμάχειον[1]` and as `urn:cite:perseus:author.776`, which is the identifier of Ister Cyrenaeus in the *Perseus Catalog*.[188]

Ambiguities and manuscript variants will be documented, and authors and works still missing in the TLG and in the *Perseus Catalog* will be assigned new identifiers, as for example the grammarian Agallis of Corcyra cited in *Deipn.* 1.25. This phase of the project will find semantic relations among annotated real entities, which means relating entities of bibliographic references in the text of the *Deipnosophists*, as for example relating author name, book number, and title in the expression Ξενοφῶν ἐν δευτέρῳ Ἀναβάσεως in *Deipn.* 2.85.

The language of bibliographic references in the *Deipnosophists* is precise and structured, and it is possible to identify regular patterns based on the morphology and on the context of words of named entities including *verba dicendi*, like for example γράφει, ἔφη, ἱστορεῖ, μέμνηται, μνημονεύει, φησίν, etc. Regular patterns and contextual clues identified in this phase will be used to annotate bibliographic relations in other texts.[189]

Part-of-Speech (POS) tagging of the *Deipnosophists* is already available in the *Lemmatized Ancient Greek XML* corpus and this data will be used during this phase of the project. Finally, INCEpTION provides a "search functionality" that allows to perform different queries for extracting and annotating relations.[190] The "fact extraction functionality" of INCEpTION will be also used to annotate relations and populate the knowledge base.[191] Data produced will be imported into ANNIS for visualization and retrieval. ANNIS is a DFG-funded project that offers a web browser-based search and visualization architecture for complex multi-layer linguistic corpora with diverse types of annotation.[192] ANNIS is also used for historical languages as in the project *Coptic SCRIPTORIUM*.[193] ANNIS will be used in the *Digital Athenaeus* project for visualizing and querying named entity annotations.

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188 https://catalog.perseus.org/catalog/urn:cite:perseus:author.776
189 Cf. Nouvel/Ehrmann et al. (2016) 77 and 80.
190 Boullosa/Eckart de Castilho et al. (2018) 128-130.
191 Klie/Bugert et al. (2018).
192 See http://corpus-tools.org/annis, Druskat/Gast et al. (2016), and Krause/Zeldes (2016).
193 Zeldes/Schroeder (2016).

Conclusion

Two main models emerge from this book: 1) the digitization of printed editions of textual fragments and 2) the annotation of textual elements about fragmentary authors and works. Both models have been presented with the description of the *Digital Fragmenta Historicorum Graecorum* and the *Digital Athenaeus* projects. Current standards and tools allow the realization of these models, but the agenda still includes a request for more data in order to produce stable results. I can summarize this request by individuating three main needs for dealing with fragmentary authors and works.

Optical Character Recognition technologies are already providing significant results, but we need further advancements for converting and structuring complex critical editions of Classical sources. The conversion into machine readable texts of these editions is fundamental to preserve ancient Greek and Latin sources and the philological editorial work that has been produced on them.

More editions of sources that preserve information about fragmentary authors and works have to be digitized in order to individuate, select, extract and interpret data in the original language and expand it. This data is essential to enrich and create new dictionaries and authority lists with inflected forms, lemmata, and named entities.

The work of scholars should focus on the production of semi-automatic annotations of textual elements about fragmentary authors and works in order to go beyond the traditional concept of *fragmenta* and represent text reuses in their context of transmission. These annotations will help create for the first time a text-based catalog of fragmentary authors and works with occurrences and variants in the ancient language.

Greek and Latin fragmentary literature is part of a bigger historical textual heritage and many other needs could be added to this short list, as demonstrated by countless publications on the Digital Humanities. The goal of this monograph and its related data is to concretely show some of these requests and opportunities, pointing also to the need for data assessment and evaluation, which have still to be satisfactorily discussed to enhance academic careers and teaching programs.

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This book describes a new model for digital editions of historical fragmentary texts, i.e. texts that have been lost in their original form and survive only through citations and reuses in later works. This book describes the current state of digital libraries of fragmentary texts and presents two new related projects: the "Digital Fragmenta Historicorum Graecorum" project, which is the digital and expanded version of the *Fragmenta Historicorum Graecorum* (FHG), and the "Digital Athenaeus" project, which provides an inventory of authors and works cited in the *Deipnosophists* of Athenaeus of Naucratis with a data model for their identification and analysis.