

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

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). Hellenicus, 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
Hellenicus	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, Hellenicus 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

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	Palaephatu s 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 Pygelenus	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 Sigeeus	Leo Alabandensis	Daimachus Plataeensis
Anaximander Milesius	Leo Pellaeus	Patrocles
Critias Atheniensis	Clytus Milesius	Demodamas Milesius
Liber secundus	Maeandrius Milesius (Lean-	Demodamas Halicarnassen-
Themistogenes Syracusanus	der Milesius)	sis
Sophaenetus Stymphalius	Antipater Macedo	Demochares Leuconoensis

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

Hieronimus Cardianus	Duris Samius	Craterus Macedo
Pyrrhus Epirota	Idomeneus Lampsacenus	Persaeus Cittiensis
Proxenus	Dionysius Heracleota	Demetrius Byzantius
Cineas Thessalus	Berosus Chaldaeus	Sosibius Laco
Suidas	Manetho Sebennyta	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 Callimachus
 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 Carthaginensis
 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 Mendesium
 Asclepiades Anazarbensis
 Aristodemus Nysaensis
 Aristodemus Eleus
 Aristodemus Thebanus
 Artavasdes Armeniae rex
 Theophanes Mytilenaeus
 Timagenes Alexandrinus
 Aristo Alexandrinus
 Socrates Rhodius
 Olympos
 Empylus Rhodius
Liber septimus
 Caecilius Calactinus
 Lysimachus Alexandrinus
 Nicolaus Damascenus

Juba Mauritanus
 Athenodorus Tarsensis
 Dionysius Pergamenus
 Diodorus Sardinus
 Theodorus Gadarensis
 Strabo Amasensis
 Chaeremon Alexandrinus
 Seleucus Alexandrinus
 Thrasyllus Mendesium
 Potamo Mytilenaeus
 Apion Oasita
 Thallus
 Pamphila Epidauria
 Claudius Caesar
 Polyaeus Sardinus
 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 Naucratis	Ephorus Cumanus	Dexippus Atheniensis
Judas	Nicostratus Trapezuntius	Arrianus
Severus Imperator	Nicomachus	Porphyrius Tyrius
Asinius Quadratus	Callicrates Tyrius	Eusebius
Nicagoras Atheniensis	Theocles	Onasimus
Lupercus Berytius	Asclepiodotus	Claudius Eusthenes
Callinicus Petraeus	Zenobia	

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	Agathonymus	Apollonhemis
Praxagoras Atheniensis	Agasilas	Archemachus Euboeus
Bemarchius Caesariensis	Agias Argivus	Aretades Cnidius
Eustochius Cappadox	Aglaosthenes	Aretes Dyrrachinus
Magnus Carrhenus. Eutychi- anus Cappadox	Agathosthenes	Archinus
Eunapius Sardinianus	Agriopas	Architimus
Olympiodorus Thebaeus	Agroetas	Ariaethus Tegeata
Priscus Panites	Alcetas	Aristaenetus
Malchus Philadelphensis	Alcimius Siculus	Aristeas Argivus
Capito Lycius	Alexarchus	Aristides Milesius
Candidus Isaurus	Alexis Samius	Aristippus
Eustathius Epiphaniensis	Amphicrates Atheniensis	Aristo Pellaeus
Hesychius Milesius	Amphilochus	Aristobulus
Nonnosus	Amphion Thespiensis	Aristocles
Petrus Patricius	Anaxicrates	Aristocrates
Anonymus qui Dionis Cassii Historias continuavit	Anaxilaus	Aristocreon
Menander Protector	Andreas Panormitanus	Aristocritus
Theophanes Byzantius	Andriscus	Aristomenes
Joannes Epiphaniensis	Androetas Tenedius	Aristonicus Tarentinus
Liber decimus	Andronicus Alypius	Aristonymus
Abas	Antenor	Aristophanes Boeotus
Abron vel Habron Batiensis	Antigonus	Armenidas
Abydenus	Antileo	Artemidorus Ascalonita
Acesander	Antilochus	Artemon Clazomenius
Acestodorus vel Acestorides	Antimachus	Artemon Pergamenus
Achaeus	Antiochus	Artemon Cassandrensis
Aeneas	Antipater	Astynomus
Adaes Mytilenaeus	Apellas sive Apollas Ponticus	Athanadas
Aenesidemus	Aphrodisius vel Euphemius	Athenaeus
Aethlius Samius	Apollodorus Artemiten	Athenicon
Agaclytus	Apollodorus Erythraeus	Athenocles
Agathocles Cyzicenus vel Babylonius	Apollonides Horapion	Athenodorus Eretriensis
Agathon Samius	Apollonius Aphrodisiensis	Augeas
	Apollonius Ascalonita	Autesion
	Apollonius Acharnenses	Autocharis
	Apollonius Rhodius	Autocrates

Balager	Demaratus	Heraclitus Lesbios
Basilis	Demetrius Callatianus	Hereas
Baton Sinopensis	Demetrius Erythraeus	Hermaeus (Hermeas)
Bion Solensis	Demetrius Iliensis	Hermesianax Cyprius
Botryas Myndius	Demetrius Odessanus	Hermesianax Colophonius
Bruttius sive Brettius	Demetrius Salaminus	Heron Atheniensis
Butorides	Democritus Ephesius	Hippoxythus
Caemaro	Demognetus	Hicesius
Callicrates	Demosthenes Bithynus	Hiero
Callidemus	Demoteles	Hierocles
Calliphanes	Dercylus Argivus	Hippagoras
Callippus Corinthius	Dieuchidas	Hippasus Lacedaemonius
Domitius Callistratus	Dinarchus	Hippias Erythraeus
Carystius Pergamenus	Dion Academicus	Hippostratus
Cassander Salaminus	Diogenes Cyzicenus	Histiaeus
Cercidas Megalopolitanus	Diogenes Sicyonius	Hypermenes
Charicles	Dionysius Chalcidensis	Hyperochus Cumanus
Charon Naucratis	Diophantus	Hypsicrates
Chrestodemus	Diophantus Lacedaemonius	Isigonus Nicaeensis
Christodorus	Aelius Dius	Laetus
Chrysermus Corinthius	Dosiades	Lamiscus Samius
Chrysippus	Dositheus	Laosthenidas
Claudius Iolaus	Draco	Leocrines
Claudius Theon	Echemenes	(Leonides)
Clodius Neapolitanus	Echephyllidas	Linus Oechaliensis
Clemens	Empodus	Lepidus
Cleobulus	Epaphus	Lucillus Tarrhaeus
Cleon Magnesius	Eparchides	Lyceas Naucratis
Cleon Syracusanus	Epimenides	Lysanias Mallotes
Clinias	Ergias Rhodius	Macareus
Cleophanes	Erxias	Malacus
Cleophorus	Euagoras Lindius	Marcellus
Clitonymus	Eualces	Megacles (Megaclides)
Clitophon Rhodius	Euanoridas Eleus	Melanthius
Conon	Eucrates	Melanthius Pictor
Cosmes	Eudoxus Rhodius	Melisseus
Crates Atheniensis	Euemeridas Cnidius	Melito
Creon vel Paeon Amathusius	Euelpis Carystius	Menander Ephesius
Creophylus	Euthymenes	Meneclis Barcaeus
Critolaus	Glaukipus	Menelaus Anaeus
Criton Pieriota	Glaucus	Menesthenes
Ctesicles	Gorgias Atheniensis	Menetor
Ctesiphon	Gorgon	Menippus
Ctesippus	Harmodius Lepreates	Menyllus
Cydippus Mantinensis	Aelius Harpocraton	Metrophanes
Daes Colonensis	Hegemon Alexandrensis	Mnesimachus
Dalion	Hegesander Delphus	Mnasigiton
Damon	Hegesander Salaminus	Molpis Laco
Damocritus	Hegesidemus Cythnius	Monimus
Demades	Hegesippus Meczybernaeus	Myronianus Amastrianus
Demagoras Samius	Heliodorus Atheniensis	Myes

Myrsilus Methymnaeus	Philonides. Philogenes	Telephanes
Myron Priensis	Philteas	Telesarchus
Nicander Chalcedonius	Pisistratus Liparaeus	Teucer Cyzicenus
Nicander Alexandrinus	Polyanthus Cyrenaeus	Teupalus Andriensis
Nicander Thyatireus	Polycharmus (Naucratis)	Theagenes (Macedo)
Nicias	Polycrates	Themiso
Nicias Maleotes	Polygnostus sive Polygnotus	Themistagoras Ephesius
Nicias Nicaeensis	Polyzelus Rhodius	Theocles
Nicocles Lacedaemonius	Posidippus	Theodori
Nicomachus	Possis Magnesius	Theodorus Rhodius
Nicomedes Acanthus	Praxion	Theodorus Hierapolita
Nicocrates	Procles Carthaginiensis	Theodorus Samothrax
Nicostratus	Protagorides Cyzicenus	Theodorus Iliensis
Olympichus	Protarchus Trallianus	Theognis
Pamphilus	Ptolemaeus Mendesium	Theolytus (Methymnaeus)
Pappus	Pyrrhander	Theophilus
Parthax	Pyrgion	Theotimus
Pasiteles	Pyrrho Liparaeus	Theseus
Pausanias Laco	Pythaenetus	Timagetus
Pausanias Damascenus	Pythagoras	Timagoras
Pausimachus Samius (Paxamus)	Pythermus Ephesius	Timolaus
Petellides Cnossius	Pythocles Samius	Timomachus
Phaestus	Scamon Mytilenaeus	Timonax
Phanocritus	Scythinus Teius	Timotheus
Phanodius	Seleucus Emesenus	Uranius
Pharnuchus Nisibenus (Philalius Corinthius)	Semerionius Babylonius	Xenagoras
Philemon	Semus Delius	Xenion
Philetas Ephesius	Socrates Argivus	Xenocrates
Philippus Theangelensis	Socrates Cous	Xenophilus
Phillis Delius	Sosander	Zenis
Philistides	Sosicrates	Zenodotus Troezenius
Philistus Naucratis	Sosicrates Rhodius	Zopyrion
Philocrates	Sosthenes Cnidius	Zopyrus Byzantius
Philomnestus	Sostratus	Appendix ad librum nonum
	Staphylus Naucratis	Joannes Antiochenus
	Stesiclidus Atheniensis	

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	Joannes Antiochenus	Photius
Eusebius	Joannes Malala	Anonymus
Priscus	Critobulus	Dionysius Byzantius

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 an *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.

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

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-

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.

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.

Stato	Metodo	Domínio	File	Origine	Tipo	Trasferito	Dimensione	0 ms	512 s	10.24 s	10.24 s
200	POST	www.dfhg-project.org	get_results.php	xhr	html	6,55 kB	21,79 kB	1948 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	731 B	666 B	2001 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	5,09 kB	15,16 kB	2015 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	660 B	522 B	2036 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	3,20 kB	7,05 kB	2272 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	3,17 kB	6,96 kB	2271 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	6,57 kB	19,11 kB	2240 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	1,15 kB	1,53 kB	2263 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	1,96 kB	4,25 kB	2276 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	11,16 kB	32,77 kB	2289 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	7,24 kB	22,21 kB	2559 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	108,46 kB	376,05 kB	2888 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	28,57 kB	103,30 kB	2699 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	22,08 kB	73,56 kB	2640 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	14,12 kB	48,13 kB	2631 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	4,57 kB	11,64 kB	2595 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	665 B	463 B	2681 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	4,44 kB	9,70 kB	2673 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	30,61 kB	100,66 kB	3029 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	4,37 kB	9,16 kB	2682 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	1,64 kB	2,30 kB	3064 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	10,73 kB	35,65 kB	3174 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	2,01 kB	3,52 kB	3149 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	23,43 kB	81,51 kB	3218 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	3,18 kB	8,43 kB	3266 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	1,29 kB	1,58 kB	3290 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	1,36 kB	2,58 kB	3264 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	5,24 kB	18,08 kB	3445 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	5,22 kB	13,97 kB	3448 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	3,17 kB	7,55 kB	3559 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	7,57 kB	23,56 kB	3563 ms			
200	POST	www.dfhg-project.org	get_results.php	xhr	html	121,65 kB	467,21 kB	4226 ms			
153 richieste 8,16 MB di 2,33 MB trasferiti Completato: 13,32 s DOMContentLoaded: 866 ms load: 13,98 s											

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 Historiarum 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).

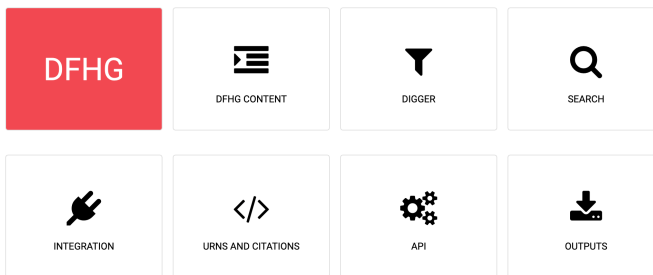



Figure 4.3. DFHG tools

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*).

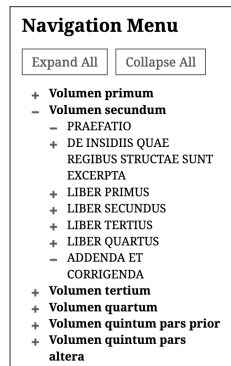


Figure 4.4. DFHG navigation menu (partly expanded)

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:

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.



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*

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 ΣΙΚΕΛΙΚΑ.), 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

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 exact 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).

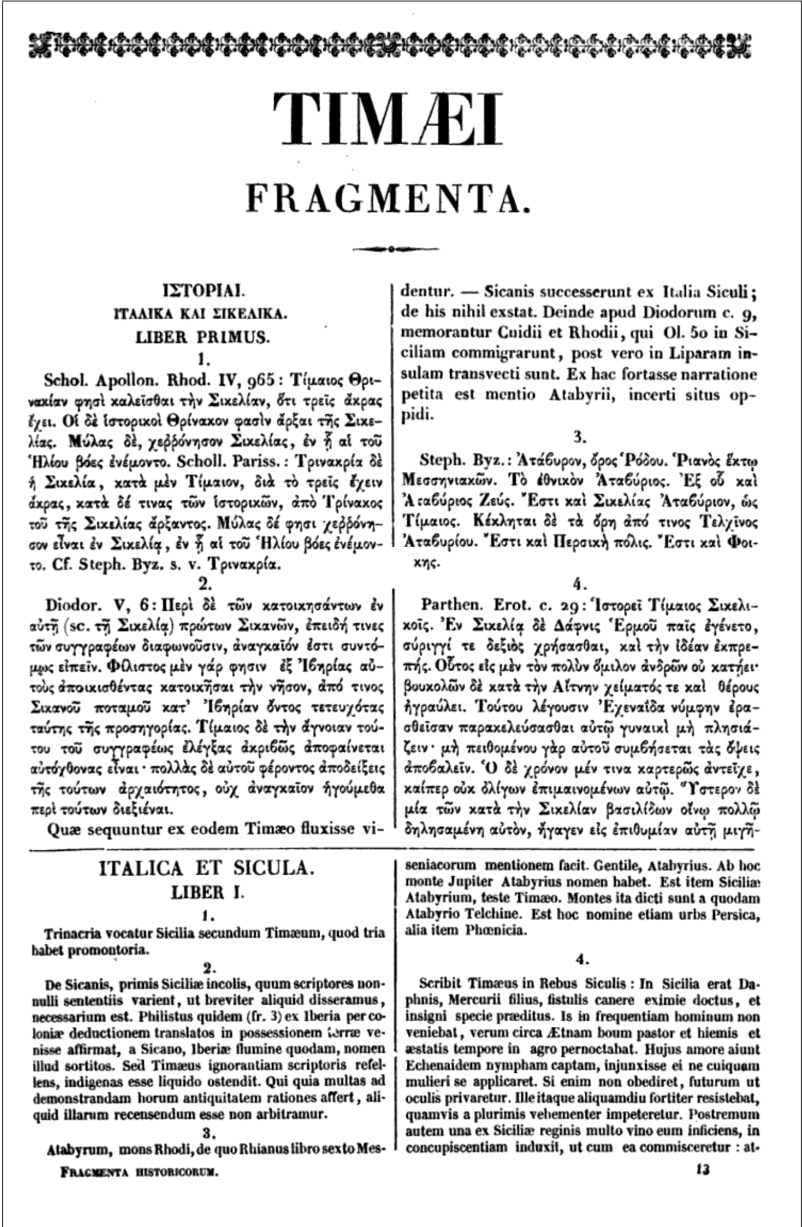


Figure 4.6. FHG I 193: printed edition

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 θρινακον φασὶν ἄρξαι τῆς Σικελίας.
30811	Μύλας δὲ, χερβρόνησον Σικελίας, ἐν ἡ αὐ τοῦ
30812	ἡλίου βόες ἐνέμοντο. Scholl. Pariss.: Τρινακρία δὲ
30813	ἡ Σικελία, κατὰ μὲν Τίμαιον, διὰ τὸ τρεῖς ἔχειν
30814	ἄκρας, κατὰ δὲ τινὰς τῶν ἱστορικῶν, ἀπὸ Τρίνακος
30815	τοῦ τῆς Σικελίας ἀρξάντος. Μύλας δὲ φησὶ χερβρόνησον
30816	εἶναι ἐν Σικελίᾳ, ἐν ἡ αὐ τοῦ ἡλίου βόες ἐνέμοντο
30817	Cf. Steph. Byz. s. v. Τρινακρία.</p>
30818	2.
30819	<p>Diodor. V, 6: Περὶ δὲ τῶν κατοικησάντων ἐν
30820	αὐτῇ (sc. τῇ Σικελίᾳ) πρώτων Σικανῶν, ἐπειδὴ τινες
30821	τῶν συγγραφέων διαφωνοῦσιν, ἀναγκαῖόν ἐστι συντάμνω
30822	εἰπεῖν. Φίλιστος μὲν γὰρ φησὶν ἐξ Ἰβηρίας αὐτοὺς
30823	ἀποικισθέντας κατοικῆσαι τὴν νῆσον, ἀπὸ τινος
30824	Σικανοῦ ποταμοῦ κατ' Ἰβηρίαν ὄντος τετευχότας
30825	ταύτης τῆς προσηγορίας. Τίμαιος δὲ τὴν ἄνοιαν τούτου
30826	τοῦ συγγραφέως ἐλέγξας ἀκριβῶς ἀποφαίνεται
30827	αὐτόχθονας εἶναι· πολλὰς δὲ αὐτοῦ φέροντος ἀποδείξεις
30828	τῆς τούτων ἀρχαιότητος, οὐχ ἀναγκαῖον ἠγοῦμεθα
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. 50 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.: Ατάβυρον, ὄρος Ρόδου. Ριανὸς ἔκτω
30839	Μεσσηνιακῶν. Τὸ ἐθνικὸν Αταβύριος. Ἐξ οὗ καὶ
30840	Αταβύριος Ζεὺς. Ἔστι καὶ Σικελίας Αταβύουριον, ὡς
30841	Τίμαιος. Κέκληται δὲ τὰ ὄρη ἀπὸ τινος Τελχίνου
30842	Αταβυρίου. Ἔστι καὶ Περσικὴ πόλις. Ἔστι καὶ Φοινίκης.</p>
30843	4.
30844	<p>Parthen. Erot. c. 29: Ἱστορεῖ τίμαιος Σικελικοῖς.
30845	Ἐν Σικελίᾳ δὲ Δάφνης Ἐρμού παῖς ἐγένετο,
30846	σὺργίγῃ τε θεξιδῶς χρῆσασθαι, καὶ τὴν ἰδέαν ἐκπρεψῆς.
30847	Οὗτος εἰς μὲν τῶν πολλῶν ὄμιλον ἀνδρῶν οὐ κατῆι·
30848	βουκολῶν δὲ κατὰ τὴν Αἴττην χεῖματός τε καὶ θέρους
30849	ἠργαλεῖ. Τοῦτου λέγουσιν Ἐχναί(?)δα νύμφην ἔρασεθεῖσαν
30850	παρακελεύσασθαι αὐτῇ γυναῖκα μὴ πλησιάζειν·
30851	μὴ πεποιημένου γὰρ αὐτοῦ συμβῆσθαι τὰς θυσίας
30852	ἀποβαλεῖν. Οὐ δὲ χρόνον μὲν τινος καρτερῶς ἀντεῖχε,
30853	καίπερ οὐκ ὀλίγων ἐπιμνησθέντων αὐτῷ. Ὑστερον δὲ
30854	μία τῶν κατὰ τὴν Σικελίαν βασιλίδων οἴνω πολλῷ
30855	δλησασμένη αὐτὸν, ἤγαρεν εἰς ἐπιθύμιαν 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 Siciliae incolis, quum scriptores nonnulli
30864	sententiis variant, ut brevier aliquid disseramus,
30865	necessarium est. Philistus quidem (fr. 3) ex Iberia per colonia
30866	deductionem translato in possessionem terræ venisse
30867	affirmat, a Sicano, Iberiæ flumine quodam, nomen
30868	illud sortitos. Sed Timæus ignorantiam scriptoris reflens,
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 Rhanus libro sexto MesFRAGMENTA
30874	HISTORICORUM.
30875	seniacorum mentionem facit. Gentile, Atabyrius. Ab hoc
30876	monte Jupiter Atabyrius nomen habet. Est item Siciliae
30877	Atabyrium, teste Timæo. Montes ita dicti sunt a quodam
30878	Atabyrio Telchine. Est hoc nomine etiam urbs Persica,
30879	alia item Phenicia.</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

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 Critobulus 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–lxxx). The second part of the introduction is about the Atthidographers collected in the volume (*De Atthidum scriptoribus*: lxxxii–xc) 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–xc). The content of these pages including footnotes has been added in the DFHG at the beginning of each relevant author of FHG I. Moreover, 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, whenever 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

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

⁴⁰ Numbering depends on many different interpretations 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 BELLII PELOPONNESIACI. 520–404 A.C. NOMINA AUCTORUM. CADMUS MILESIUS. [HECATAEUS MILESIUS.] DIONYSIUS MILESIUS. HIPPIAS RHEGINUS. EUGEON SAMIUS. DEIOCHUS PROCONNESIUS. BION PROCONNESIUS. EUDEMUS PARIUS. DEMOCLES PYGELENSIS. AMELESAGORAS CHALCEDONIUS. [ACUSILAUS ARGIVUS.] [PHERECYDES LERIVS.] [CHARON LAMPSACENUS.] [XANTHUS LYDIUS.] [HELLANICUS MYTILENAEUS.] [ANTIOCHUS SYRACUSANUS.] GLAUCUS RHEGINUS. HERODORUS HERACLEENSIS. SIMONIDES CEUS. XENOMEDES CHIUS. ION CHIUS. STESIMBROTUS THASIVS. 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 THASIVS: FHG I 104 and II 52). Seven authors in the FHG

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: [DEMODAMAS HALICARNASSENSIS]. FHG IV: (ACHAEUS), (AGATHOSTHENES), (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 EPIDAUURIAE FRAGMENTA: FHG III 520).⁴⁹
7. **work:** titles of works of authors collected in the FHG (e.g., BIBΛIOΘΗΚΗΣ 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 μὲν ἐστὶ 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., Προσίου συμπτώματα of the fourth book of the ΠΕΡΙ-ΠΕΤΕΙΑΙ of Nicander Chalcedonius: FHG IV 462).

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 ΒΙΒΛΙΟΝ 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 Z of section 7 of the ΠΕΡΙ ΤΩΝ ΕΝ ΠΑΙΔΕΙΑ ΔΙΑΛΛΑΜΨΑΝΤΩΝ (ΣΟΦΩΝ) of the ΙΣΤΟΡΙΑ ΡΩΜΑΙΚΗ ΤΕ ΚΑΙ ΠΑΝΤΟΔΑΠΗ 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 προσήρχοντο 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 fr. 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 ἀνδριάντων 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 fr. (4) and (5)), *square brackets* (e.g., FHG II 29 fr. [2] and 34 fr. [22]), and *question marks* (e.g., FHG I 1 fr. 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 fragmentary 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] ὄν[1] νόμφας[1] καβειράδας[1]” of fragment 6 of Acusilaus: FHG I 100). Numbering 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 letters 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 information 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

51 The TLG adopts the same numbering, while in other cases it adds letters and also other numbers, as for fr. 44 and 46 of Pherecydes (TLG fr. 44a–c and 46a–f) or for fr. 33a of the same author (TLG fr. 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· Ἰππίαν 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

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 φησί καλεῖσθαι τὴν Σικελίαν, ὅτι τρεῖς
10	1. Scholl. Pariss.: Τρινακρία δὲ ἡ Σικελία, κατὰ μὲν Τίμαιον, διὰ τὸ τρεῖς ἔχειν ἄκρας, κα
11	2. Diodor. V, 6: Περὶ δὲ τῶν κατοικησάντων ἐν αὐτῇ (sc. τῇ Σικελίᾳ) πρώτων Σικανῶν, ἐπειδὴ
12	3. Steph. Byz.: Ἀτάβυρον, ὄρος Ῥόδου. Ριανὸς ἔκτω Μεσσηνιακῶν. Τὸ ἔθνικόν Ἀταβύριος. Ἐξ ο
13	4. Parthen. Erot. c. 29: Ἰστορεῖ Τίμαιος Σικελικαίος. Ἐν Σικελίᾳ δὲ Ἀδρῆνις Ἐρμού παῖς ἐγένε
14	##page##:194
15	5. Schol. Apollon. Rhod. IV, 786: Πλαγκταὶ πέτραν ἐν τῷ πορθμῷ εἰσίν, ὡς Τίμαιος καὶ Πεισ
16	6. Diodor. IV, 56: Ὅρκ ὄλιγοι τῶν τῶν ἀρχαίων συγγραφεῶν καὶ τῶν μεταγενεστέρων, ὧν ἔστι κα
17	7. Schol. Apollon. Rhod. IV, 1217: Τιμῶναξ ἐν πρώτῳ τῶν Σικελικῶν ἐν Κόλχησι φησὶν Ἰάσονα
18	##page##:195
19	8. Idem IV, 1153: Ἰστέον ὅτι Τιμαίου λέγοντος ἐν Κερκύρα τοῦς γένους (sc. Μηβείας) ἀρχθνα
20	9. Idem II, 408: Κίρκρατον δὲ τόπος ἐστὶ τῆς Κολχίδος, ἀπὸ Κίρκης τῆς Αἰθίτου ἀδελφῆς, ἣ πέ
21	10. Praeter Argonautarum expeditionem Timaeus in primis Siculorum libris iter Herculis ex
22	11. Diodor. IV, 22: Ὁ δ' οὖν Ἡρακλῆς κατανηθῆσας ἐπὶ τὸν πορθμὸν κατὰ τὸ στενωπὸν τῆς θα
23	12. Gell. Noctt. Att. I, 1: Timaeus in Historiis, quas oratione graeca de rebus populi R
24	13. Tzetzes ad Lycophr. 615: Ἀλούσης τῆς Τροίας Διομήδης ἀντὶ βάρους λίθους ἐκ τοῦ τείχου
25	##page##:196
26	14. Idem ibid. 1137: Αἱ δὲ τῶν Ἀσυνίων γυναῖκες μέλαιναν ἐσθῆτα φοροῦσι, καὶ τὰς ὄψεις βάπ
27	15. Idem ibid. 1050: Εἰλωσαιν οὐ Ἀσυνίον, ἦτοι οὐ Κалаβροὶ, ἐν μηλωταῖς καθεδεῖν ἐν τῷ τ
28	16. Strabo V, p. 248: Καὶ Τίμαιος δὲ περὶ τῶν Πιθηκουσῶν φησὶν ὑπὸ τῶν παλαιῶν πολλὰ παρ
29	17. Antig. Caryst. c. 167: Heraclides Ponticus paludem Sarmatiae esse dicit, quam nulla u
30	18. Athenaeus IV, I3, p. 153, D, de luxuria Etruscorum disserens, Τίμαιος, ἰναίτη, ἐν τῇ
31	18. Idem XII p. 517, D: Παρά δὲ Τυρρήνοις, ἐκτόπως τρωφάσιν, ἱτρορεῖ Τίμαιος ἐν τῇ π
32	##page##:197
33	19. Tertullian. De spectacul. p. I39, 28 Franecq. 1697: Lydos ex Asia transvenas in Metru
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 ἰκανὰ ἠγνοῦμαι τὰ προεξηρημένα. Τὸν δὲ τ
36	21. Synzell. Chron. p. 155, in Corp. Scriptt. Ryz. tom. VII: Τίμαιος μὲν πρώην καὶ Καλλία
37	22. Plin. Hist. N. III, I3: Servius rex primus signavit oes. Antea rudī usos Romae Timaeus
38	23. Excerptt. ex Cod. Matrit. ad calcem Polyaeen. ed. Tychsen. in Bibl. Gotting. liter. et
39	##page##:198
40	24. Polyb. XII, 3, Exc. Vatic.: Τὸν δὲ Τίμαιον εἰποῖ τὴν οὐδὸν ἀνιστόρητον γεγενῶσα
41	25. Ad librum, ubi de Libya sermonem instituit, referre possis locum de filiabus Atlantis
42	##book##:LIBER II
43	26. Polyb. XII, 3: Καθῶπερ δὲ καὶ περὶ τῶν κατὰ Λιβύην ἀποσεχέδιακεν, οὕτω καὶ περὶ τῶν κα
44	27. Plin. H. N. III, 13: Sardiniam ipsam Timoeus Sandaliotian appellavit ab effigie soleos
45	##page##:199
46	28. Tzetz. Ad Lycophr. 796: Ἡ δὲ Σαρῶν, νήσος περὶ τὰς Ἡρακλέας (leg. Ἡρακλεῆς) στήλας.
47	29. Suidas: Σαρδάνιος γέλωας. Ὁ προσποιήτος. Καλεῖσθαι δὲ αὐτὸν φασὶν ἀπὸ τοῦ σεσπρένα το
48	30. Strabo XIV, p. 654: Τινὲς δὲ μετὰ τὴν ἐκ Τροίας ἐξοδὸν τὰς Γυμνησάδας νήσους οὐ αὐτῶν
49	31. Tzetz. Ad Lycophr. 633: Αἱ δὲ Γυμνησάδες αὐτὰι, νήσοι περὶ τὴν Τυρρανίαν εἰσὶ. Μέντην
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: Insulose compures sine nominibus eo situ (in Oceano septentrionali)
53	34. Idem ibid. XXVII, II: Pytheas scribit, Guttonibus, Germanibus genti, accoli oestuarium
54	35. Idem ibid. IV, 22: In ipso capite Boeticoe, ab ostio freti passuum XXV mill. Gadis, u
55	36. Plutarch. De placit. philos. p. 90I Wechel.: Πᾶς ἀμυμῆτες γίνονται καὶ πλημυρῆται· ἰ
56	37. Etyim. M.: Γαλατία, χώρα ἀνομόσθη, ὡς φησὶ Τίμαιος, ἀπὸ Γαλάτου, Κύκλωπος καὶ Γαλατία
57	38. Strabo IV, p. 183: 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 Φυακῶν. Ἐκατ
60	40. Scymn. Chius Orb. descript. v. 208 sqq. Μασσαλία δ' ἐστ' ἔχουμένη πόλις μεγίστη, φυκαῶν
61	41. Polyb. II, 16, I3, de Eridano: Τᾶλλα δὲ τὰ περὶ τὸν ποταμὸν τοῦτον ἱστοροῦμενα παρὰ τ
62	42. Scymn. Chius v. 404 sqq. (Geogr. min. T. II, p. 24) Hdsou.: Ἐξῆς δὲ μεγάλη χερσόνησος
63	43. Stephan. Byz.: Ἀργύρινοι, ἔθνος Ἡπειρωτικόν, ὡς Τίμαιος καὶ ὅσων. Καὶ Λυκόφρων. Εἰς Ἀ
64	44. Athenaeus XIII, 8, p. 602, F: Τὸ παιδεραστεῖν παρὰ πρώτων Κρητῶν εἰς τοὺς Ἑλληνας παρ
65	44. Idem V, 28, p. I8I, C: Οἱ δὲ Λακωνισταὶ λεγόμενοι, φησὶν ὁ Τίμαιος, ἐν τετραγώνις χο
66	45. Diog. Laert. V. Epimen. I, II4: Φησὶ δὲ Δημήτριος τινὰς ἱστορεῖν, ὡς λάβοι παρὰ Νυμφῶ
67	##page##:202
68	46. Plutarch. Lycurg. c. 3I: Τελευτήσῃ δὲ τὸν Λυκόφρον οἱ μὲν ἐν Κίβρα λέγουσιν. Ἀπολλ
69	47. Idem ibid. c. I: De tempore quo vixerit Lycurgus haud liquet. Οἱ μὲν γὰρ Ἰστίφ συνοικμ
70	##book##:LIBER III
71	48. Athenaeus VI, 2I, p. 272, B: Κάν τῇ τρίτῃ δὲ τῶν Ἱστοριῶν ὁ Ἐπιτίμαιος ἔφη, οὕτως εὐδ
72	49. Strab. XIII, p. 896, A: Τίμαιον ψευδοασαῖ φησὶν ὁ Δημήτριος ἱστοροῦντα ἐκ τῶν λήθων τ
73	50. Schol. Pindar. Ol. XIII, 29: Ὁ ἀετὸς οἰωνῶν βασιλεὺς ἐστὶν ὁ ἐπὶ τῶν ἱερῶν τιμειόμεν
74	51. Folyb. XII, 4, d. Exc. Vat.: Φησὶ τοιγαροῦν τὴν Ἀρθεσίουσαν κρήνην τὴν ἐν ταῖς Συρακούσαι
75	##page##:203
76	52. Strabo VI, p. 270: Ἡ δ' ὀρτυγία συνάπτει γεφύρα πρὸς τὴν ἥπειρον (suppl. Πρόσγειος) σ
77	53. Schol. Apollon. Rhod. IV, 1216: Τίμαιος φησὶ, μετὰ ἔτη ἐξεκάστια τῶν Τρωικῶν Χερσικρά
78	54. Idem IV, 983: Ἡ Κέρχρα πρότερον μὲν Δρεπάνη ἔκαλετο, εἶτα Σχερία· Ἀποδοῖσαι 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 Γεωμῶν ἐν Συρακούσαις γεγόμενοι, πολλοὶ 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 variant, 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 Medaeae nuptiae in Circeya celebratae sunt. Dionysius vero Milesius libr
17	9. Circaeum locus est vel campus Colchidis a Circe Aetaeae sorore nominatus. Non potest ab
18	10. Hercules a Tiberi profectus et maritimos Italiae, quae nunc quidem vocatur, tractus p
19	11. Hercules quae arctissimum est mare delatus boves transiecit in Siciliam, ipse vero app
20	12.
21	13. Postquam Troja capta erat, Diomedes lapides e muro Troiae in navem suam coniecit 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 solent b
26	18. Timaeus Historiarum libro primo ait, apud Etruscos famulas etiam, priusquam adultae s
27	18. Apud Etruscos, supra modum luxuriae et mollietiae 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 Pygmalii
34	24. Timaeum jure pronuntiet aliquis non solum imperitium rerum Africae, sed etiam perulii
35	25. Stellas, quaelocum habent in fronte Tauri, Hyades autem 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 Carthaginenses. Proveni
40	29. Sardanius risus, id est, simulatus. Eum autem sic dictum esse aiunt a <i>σῆρνεύειν</i> , 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, Cyclopi et Galataeae 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 condideru
52	41. Cetera quae de Pado a Graecis sunt prodita, narrationem inquam de Phaethonte et ejus
53	42. Sequitur magna Chersonesus Hyllica, Peloponneso fere aequalis. In qua quindecim urbes
54	43. Argyrini, gens Epirotica, auctoribus Timaeo et Theone. Hujus quoque Lycophron meminit
55	44. Puerorum amor a Cretensibus primis ad Graecos venit, ut narrat Timaeus.
56	44. Laconistae qui dicuntur, referent Timaeo, in choris quadratis caneant.
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 Epitimaus tertio Historiarum libro dixerat, ita opulentam fuisse Corinthiorum c
62	49. Mendacii accusat Timaeum Demetrius, quod ille perhiberet, Periandrum ex Iliaciis lupi
63	50. Timaeus etiam fastigium triangulare in fronte et postico temporum, 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 Smyndirida Sybarita, ejusque luxuria, Herodotus memorat libro sexto: <ambituum 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 tenerant 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 Pythis canendo concerta
81	##book##:LIBER IX (I).
82	66. Ajace Locro naufragum circa Gyraes perperso et in Tremonte Dei loco commorato, Locr

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 Escorialensis* 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 Escorialensis* 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 Escorialensis* Ω.I.11 (36324) (foll. 188r–v and 190v–196v) with critical notes.

⁵⁹ See p. 135.

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 Sluisanus* (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 *excerpta* 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 Ἐλλάδι 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 (fr. 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 Escorialensis* 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

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 (fr. 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 διαλαμφάντων 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):

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 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 Escorialensis* 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 Escorialensis* Ω.I.11.⁷³
- Joannes Malala (38–39). Müller publishes an *excerptum* of the *Chronographia* of Joannes Malala found in the *Codex Escorialensis* Ω.I.11 after the text of Joannes Antiochenus.⁷⁴
- Critobulus (52–161). The five books of *De rebus gestis Mechemetis* have been

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.Ī. 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 *Anaplys 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 Historico-rum 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

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 FG̃rHist 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, *pars 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 Stiling: 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-

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](https://www.tlgr.org/)). 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 extensively 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

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

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).

90 See p. 138.

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.

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](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 infrastructures 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

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.

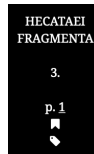


Figure 4.11. DFHG integration

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

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 morphological 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 Ἑκαταίφ, whose lemma Ἑκαταίος 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/dctthree>.

Hecataeus of Miletus, who are both authors collected in the FHG:¹⁰⁷ E 359 s.v. Ἐκαταῖος (<http://www.stoa.org/sol-entries/epsilon/359>) and E 360 s.v. Ἐκαταῖος (<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 συγγραφή, which corresponds to three lemmata: συγγραφεύς,¹¹² συγγραφή,¹¹³ and συγγράφω.¹¹⁴ These URNs are expressed according to the *CITE Architecture* and provide unique

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/dethree/harpokration> and <https://github.com/dctthree/photios>.

111 The resource is available at <http://folio2.furman.edu/ljsj/>. 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 *συγγροαφῆ*.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 depends 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,

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 *συγγροαφῆ*, 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 fragmentary historiography and in particular of Attidography, 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 reloading 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:

120 Berti/Almas et al. (2016); Berti (2018); Berti (2019c).

121 On these translations, see p. 149 n. 50.

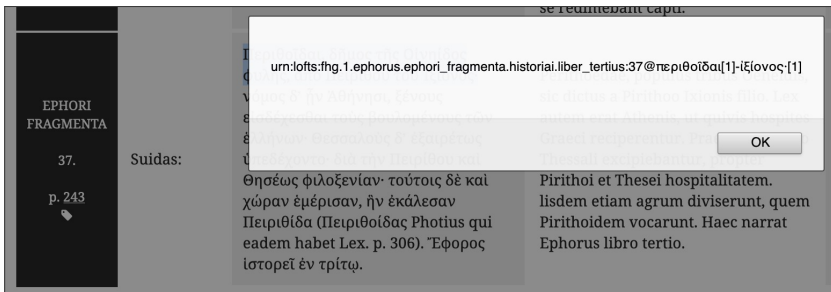


Figure 4.12. LOFTS URN: Ephorus fr. 37

- 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.bibliothecae.liber_primus.caput_i:1@οὐρανός[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).

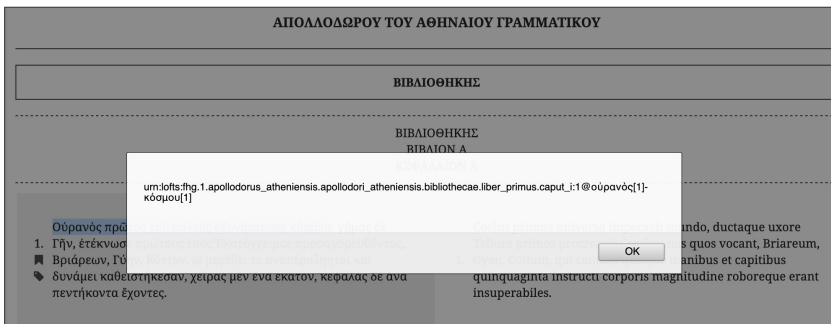


Figure 4.13. LOFTS URN: Apollodorus, *Bibl.* 1.1.1

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 Τυρρῶηνούς φησι, Πελασγοὺς πρότερον καλουμένους, ἐπειδὴ κατώκησαν ἐν Ἰταλίᾳ, παραλαβεῖν ἦν 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 witness 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:

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.

The screenshot shows the DFHG URN Retriever interface. At the top, there is a search bar with the text "hellanicus_fragmenta.phoronis:1@ελλάνκοκ[1]-προσγογλα[1]" and a "Submit" button. Below the search bar, the text "HELLANICUS" is displayed. Underneath, "HELLANICI FRAGMENTA" is shown. A search box contains the word "ΦΟΡΒΙΝΕ". The main content area displays the beginning of a fragment from Hellanicus, with the text in Greek and its Latin translation. The Greek text is highlighted in yellow. On the left side, there is a sidebar with a list of "HELLANICI FRAGMENTA" and a search bar. The sidebar shows "Dionys. I. p. 45" and "Halic. Archael. I. 28:".

Figure 4.14. LOFTS URN: beginning of Hellanicus fr. 1

- | | |
|--|------------------------------------|
| Aelius Dius (FHG IV) | Aristodemus Nysaensis (FHG III) |
| Aelius Harpocration (FHG IV) | Aristodemus Thebanus (FHG III) |
| Agatharchides Cnidius (FHG III) | Arrianus (FHG III) |
| Agatharchides Samius (FHG III) | Arrianus Nicomedensis (FHG III) |
| Andron Alexandrinus (FHG II) | Artemon Cassadrensis (FHG IV) |
| Andron Ephesius (FHG II) | Artemon Clazomenius (FHG IV) |
| Andron Halicarnassensis (FHG II) | Artemon Pergamenus (FHG IV) |
| Andron Tejus (FHG II) | Asclepiades Anazarbensis (FHG III) |
| Anonymus Corinthius (FHG III) | Asclepiades Arei filius (FHG III) |
| Anonymus Milesius (FHG III) | Asclepiades Cyprius (FHG III) |
| Anonymus qui Dionis Cassii Historias continuavit (FHG III) | Asclepiades Mendesiensis (FHG III) |
| Antipater (FHG IV) | Asclepiades Myrleanus (FHG III) |
| Antipater Macedo (FHG II) | Asclepiades Tragilensis (FHG III) |
| Apollodorus (FHG I) | Athenaeus (FHG IV) |
| Apollodorus Artemiten (FHG IV) | Athenaeus Naucratis (FHG III) |
| Apollodorus Atheniensis (FHG I) | Athenodorus Eretriensis (FHG IV) |
| Apollodorus Erythraeus (FHG IV) | Athenodorus Tarsensis (FHG III) |
| Apollonius Acharnenses (FHG IV) | Bion Proconnesius (FHG II) |
| Apollonius Aphrodisiensis (FHG IV) | Bion Solensis (FHG IV) |
| Apollonius Ascalonita (FHG IV) | Callicrates (FHG IV) |
| Apollonius Rhodius (FHG IV) | Callicrates Tyrius (FHG III) |
| Aristippus (FHG IV) | Charon (FHG I) |
| Aristippus Cyrenaenus (FHG II) | Charon Naucratis (FHG IV) |
| Aristo Alexandrinus (FHG III) | Claudius Caesar (FHG III) |
| Aristo Pellaeus (FHG IV) | Claudius Eusthenes (FHG III) |
| Aristodemus (FHG V.1) | Claudius Iolaeus (FHG IV) |
| Aristodemus Eleus (FHG III) | Claudius Theon (FHG IV) |
| | Cleon Magnesius (FHG IV) |

DFHG URN Retriever

PHERECYDES

PHERECYDIS FRAGMENTA

ΙΕΥΘΥΡΙΑΙ

ΙΕΤΟΠΙΑΙ
LIBER QUINTUS

Mythi Thehani (Apollodor. III, c. 4–8); de Cadmo et de Sparti (44), de monti aureo (45), de Dionysio et de Hyadibus (46), de Medusa, Oedippi nutrice (47), de Polyuce (49), de Thesia (50), de Tydeli inhumanitate (51), Praeterea Pherecydes Locronum fabulis in hoc libro tractasse vel saltem attigisse videtur (51 a).

PHERECYDIS FRAGMENTA 44. p. 83	<p>Schol. Apollon. III, 1178:</p> <p>Φερεκύδης ἐν τῇ πέμπτῃ (cod. Paris. ἐν C) οὐτω φησὶν· «Ἐπειδὴ Κόδμος κατοικήσῃ ἐν Θήβαις. Ἄρως δέδοκται αὐτῷ καὶ Ἀθηνῶν τοῦ ὄρους τοὺς ἡμίσεις ὀδόντας, τοὺς δὲ ἡμίσεις Ἀθήνῃ καὶ ὁ Κόδμος ἀτίκτα σπείρει αὐτοὺς εἰς τὴν ἄρουραν. Ἄρως, καλεῖσθαι, καὶ σὲ ἀνοήτῳ ἀνὴρος (codex Paris. addit πολλοὶ) ὀρατομένου. Ὁ δὲ Κόδμος εὐδίας βλάβη αὐτοῦ ἀθιστάν. Οἱ δὲ δοκοντες ὧν αὐτῶν (codex Paris. ὡν ἀλήθειαν) βλάβηται, κρεττοῦσι τὴ ἀλήθειαν καὶ θύρασαν, πάλιν πέντε ὀδῶν. Ὀδοῖον, γένιον, ἔχλονος, Πέλαγος, Ὑπερίνορος, καὶ αὐτοὺς ὁ Κόδμος ποιεῖται πολλὰς, κατοικεῖται αὐτοὺς (ῥηται Κόδμος; ποιεῖται κατοικεῖται) ἐν Θήβαις.</p>	<p>Postquam Cadmus Thebis sedes sibi constituerat, Mars et Minerva dimidiata et trancos dentium partem, dimidiata Aetiae dederunt. Atque Cadmus a mare Jossas sicuti condat eos in terra, unde dicitur, in se ipsas lapides conijcere putantes mutua caede intereunt, quinque exceptis, Lidaea, Chibonia, Echione, Peaiore, Hyperenore, quos civis constituit et Thebis sedes illi assignat.</p>
PHERECYDIS FRAGMENTA 44. p. 83	<p>Schol. Pindar. Isthm. VII, 13:</p> <p>Φερεκύδης δὲ φησιν· εἰς Κόδμου, ἴδων ἐκ γῆς ἐναυτομένους ἀνὴρας ἡμίσεις, εἰς αὐτοὺς ἔβαλε λίθους· οἱ δὲ, ὡν ἀβήτων νομίζοντες βλάβηται, εἰς μάχην κρητοῦσαν.</p>	<p>Pherecydes duplex ait esse Spartorum genus: Martem enim et Minervam dimidiata dentium partem Cadmo dedisse, dimidiata Aetiae.</p>
PHERECYDIS FRAGMENTA 44. p. 83	<p>Apollodor. III, 4, 1:</p>	<p>See Pherecydes scriptum: reliquit Cadmus, inarmatos viros e terra essent conspexit; lapidi eos coniecit. Nam illi vitasiam percussit castissimatos, mutuum inter se pagam interant.</p>

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 Sardinianus (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 Naucratica (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 Gadareus (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=ACUSILAI&fragment=10` and generates the following JSON object:

```
[
  {
    "volume": "Volumen primum",
    "sub_volume": "",
    "sub_volume_note": "",
    "author": "ACUSILAI",
    "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 Αἰθλίου τοῦ Διὸς καὶ Καλύκης
    παῖδα λέγει, παρὰ Διὸς εἰληφότα δῶρον, αὐτὸν ταμίαν εἶναι θανάτου,
    ὅτε μέλλοι ὀλέσθαι. Καὶ Πείσανδρος δὲ τὰ αὐτὰ 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_fragments.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 φασίν, ὅτι μετὰ Μῶψον ἀπῆλθεν
εἰς Κιλικίαν Ἀμφίλοχος. Ἄλλοι δὲ φασίν, ὡς καὶ Ἀπολλόδωρος, ὅτι
Ἀμφίλοχος ὁ Ἀλκμαίωνος ὕστερον στρατεύσας εἰς Τροίαν, μετὰ χειμῶνα
ἀπερβίφη πρὸς Μῶψον, 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": "",

```

```

    "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, λιπῶν τὰς ἑαυτοῦ ναῦς, ἐπὶ Κίνυφα ποταμὸν ἐλθὼν,
    κατοικεῖ,– Μάννητες δὲ καὶ Πρόθοος ἐν Εὐβοίᾳ περὶ τὸν Καφηρέα σὺν
    πολλοῖς ἐτέροις διαφθεῖρονται. Νεοπτόλεμος δὲ μετὰ ἑπτὰ ἡμέρας πεζῆ
    εἰς Μολοσσούς ἀπῆλθε μετὰ Ἑλένου, καθ' ὁδοῦ θάψας τὸν Φοῖνικα. Τοῦ
    δὲ Προθόου περὶ τὸν Καφηρέα ναυαγήσαντος, οἱ σὺν αὐτῷ Μάννητες εἰς
    Κρήτην ῥιφέντες ἄκρησαν",
    "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 ἐστὶν Ἰταλίας. Ἐκλήθη δὲ οὕτω, κατὰ
    μὲν Ἀπολλόδωρον καὶ λοιποὺς, ὅτι μετὰ τὴν Ἰλίου ἄλωσιν αἱ
    Λαομέδοντος θυγατέρες, Πριάμου δὲ ἀδελφαὶ, Αἰθύλλα, Ἀστυόχη,
    Μηδεσικάστη, μετὰ τῶν λοιπῶν αἰχμαλωτῶν ἐκεῖσε γεγонуῖαι τῆς
    Ἰταλίας, εὐλαβοῦμεναι τὴν Ἑλλάδος δουλείαν, τὰ σκάφη ἐνέπρησαν· ὅθεν
    ὁ ποταμὸς Ναύαιθος ἐκλήθη, καὶ αἱ γυναῖκες Ναυπρήστιδες. Οἱ δὲ σὺν
    αὐταῖς Ἑλληνες, ἀπολέσαντες τὰ ἀκάφη, ἐκεῖ κατώκησαν.",
    "translation": "Post Trojam captam Laomedontis filiae, Priami
    sorores, Aethylla, Astyoche, Medesicaste, verentes apud Graecos
    servitutum, 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) Hellenicus, fragment 163.

The query is `api.php?author=HELLANICUS&fragment=163` and generates the two following 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 συντάξει Ἀτοσσᾶν, τὴν Περσῶν
βασιλεύσασαν, φησὶν Ἑλλάνικος.",
"translation": "Primam scripsisse epistolas Atossam Persarum
reginam, dicit Hellenicus.",
"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": "Ἀτοσσα. Ταύτην φησὶν Ἑλλάνικος ὑπὸ τοῦ πατρὸς Ἀριάσπου
ὡς ἄρρηνα τραφεῖσαν διαδέξασθαι τὴν βασιλείαν. Κρυβοῦσαν δὲ τὴν τῶν
γυναικῶν ἐπίνοιαν, τίᾳραν πρώτην φορέσαι· πρώτην δὲ καὶ ἀναξυρίδας,
καὶ τὴν τῶν εὐνούχων ὑπουργίαν εὐρεῖν, καὶ διὰ βιβλῶν τὰς ἀποκρίσεις
ποιεῖσθαι. Πολλὰ δὲ ὑποτάξασα ἔθνη, πολεμικωτάτη καὶ ἀνδρειοτάτη ἐν
παντὶ ἔργῳ ἐγένετο.",

```

```

    "translation": "Atossam (Belochi, regis Assyriorum, ut videtur,
    filiam) Hellenicus 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.hellenicus.hellenici_fragmenta.persica
    :163.b",
    "cite_urn": "urn:cite:lofts:fhg1.hellenicus: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 BELLII PELOPONNESIACI. 520-404 A.C. NOMINA AUCTORUM. CADMUS
    MILESIUS. [HECATAEUS MILESIUS.] DIONYSIUS MILESIUS. HIPPIUS
    RHEGINUS. EUGEON SAMIUS. DEIOCHUS PROCONNESIUS. BION PROCONNESIUS.
    EUDEMUS PARIUS. DEMOCLES PYGELENSIS. AMELESAGORAS CHALCEDONIUS.
    [ACUSILAUS ARGIVUS.] [PHERECYDES LERIUS.] [CHARON LAMPACENUS.]
    [XANTHUS LYDIUS.] [HELLANICUS MYTILENAEUS.] [ANTIOCHUS
    SYRACUSANUS.] GLAUCUS RHEGINUS. HERODORUS HERACLENSIS. SIMONIDES
    CEUS. XENOMEDES CHIUS. ION CHIUS. STESIMBROTUS THASIIUS. 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 τῆν Σύρτιν λέγει γίνεσθαι
κῆτη 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 Ἴθουφάλλοισις 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	Artavasdes Armeniae Rex	Caemaro
Cadmus Milesius	Empylus Rhodius	Callicrates
Eudemus Parius	Dionysius Pergamenus	Cassander Salaminius
Democritus Abderita	Diodorus Sardinus	Chrestodemus
Themistogenes Syracusanus	Theodorus Gadareus	Christodorus
Aristippus Cyrenaeus	Polyaenus Sardinus	Claudius Theon
Dionysius Tyrannus	Justus Tiberiensis	Clodius Neapolitanus
Dionysodorus Boeotus	Aspasius Byblius	Cydidippus Mantinensis
Anaxis Boeotus	Judas	Demetrius Erythraeus
Zoilus Amphipolita	Arrianus	Demetrius Iliensis
Demophilus	FHG IV	Dion Academicus
Antipater Macedo	Acestodorus vel Acestorides	Diogenes Sicyonius
Theodectes Phaselita	Aeneas	Hermesianax Colophonius
Dionysius Heracleota	Adaes Mytilenaeus	Hiero
Demetrius Byzantius	Agriopas	Hypsicrates
FHG III	Anaxilaus	Lamiscus Samius
Mnesiptolemus	Antimachus	Menippus
P. Cornelius Scipio	Antiochus	Mnasigiton
Hannibal Carthaginiensis	Apollonius Ascalonita	Myes
Xenophon	Apollonius Acharnenses	Nicomachus
Strato	Apollonius Rhodius	Pappus
Antisthenes Rhodius	Aristeas Argivus	Philalius Corinthius
Scylax Caryandensis	Aristonymus	Polygnostus sive Polygnotus
Psaon Plataeensis	Artemidorus Ascalonita	Pyrrho Liparaeus
Lucius Lucullus	Athenaeus	Pythagoras
Marcus Tullius Cicero	Athenocles	Sosander
Titus Pomponius Atticus	Augeas	Theodori
Asclepiades Cyprius	Bruttius sive Brettius	Zopyrion
Asclepiades Anazarbensis	Butorides	

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 Apollodorus Atheniensis	FHG III Phlegon Trallianus	FHG V.2 Bardesane
FHG II Dicaearchus Messenius	FHG IV Hesychius Milesius	Faustus de Byzance 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 Marmor Parium	Anonymus, qui Dionis Cassii Historias continuavit	Dionysius Byzantius
Marmor Rosettanum	Joannes Epiphaniensis	FHG V.2 Agathange
FHG II Diodorus Siculus	FHG V.1 Aristodemus	Zénob de Glag Jean Mamigonien
Polybius Megalopolitanus	Eusebius	Moïse de Khorène
Dionysius Halicarnassensis	Priscus	Le Pseudo-Callisthènes
Heraclides Ponticus	Critobulus	Gregoire Magistros Duc de La Mesopotamie
FHG III Memnon	Photius	Saint Epiphane évêque de Salamine en Chypre
FHG IV	Anonymus (Periplus Ponti Euxini)	

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 be 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		
<ul style="list-style-type: none"> • HECATAEUS (.csv) • CHARON (.csv) • XANTHUS (.csv) • HELLANICUS (.csv) • PHERECYDES (.csv) • ACUSILAUS (.csv) • APOLLODORUS ATHENIENSIS (.csv) 	<ul style="list-style-type: none"> • ANTIUCHUS (.csv) • PHILISTUS (.csv) • TIMAEUS (.csv) • PPHORUS (.csv) • THEOPOMPUS (.csv) • PHYLRARCHUS (.csv) • CLIDEMUS (.csv) • PHANODEMUS (.csv) 	<ul style="list-style-type: none"> • ANDROTIO (.csv) • DEMO (.csv) • PHILOCHORUS (.csv) • ISIFR (.csv) • APOLLIDORUS (.csv) • MARMOR PARIUM (.csv) • MARMOR ROSETTANUM (.csv)
Volumen secundum		
<ul style="list-style-type: none"> • DIODORUS SICULUS (.csv) • POLYBIUS MEGALOPOLITANUS (.csv) • DIONYSIUS HALICARNASSENSIS (.csv) • CADMUS MILESIUS (.csv) • DIONYSIUS MILESIUS (.csv) • DIONYSIUS MYTILENAEUS (.csv) • DIONYSIUS RHODIUS SIVE SAMIUS (.csv) • HIPPEUS RHEGINUS (.csv) • EUGION SAMIUS (.csv) • DEIOCHUS PROCONNESIUS (.csv) • BION PROCONNESIUS (.csv) • ELDEUS PARIUM (.csv) • DEMOCLES PYGAELENSIS (.csv) • AMELIAGORAS CHALCEDONIUS (.csv) • GLAUCUS RHEGINUS (.csv) • DEMOCRITUS ABDERTIA (.csv) • HERODOTUS HERACLENSIS (.csv) • SIMONIDES CEUS (.csv) • XENOMEDES CHIUS (.csv) • ION CHIUS (.csv) • STESIMBROTUS THASIS (.csv) • HIPPIAS ELIUS (.csv) 	<ul style="list-style-type: none"> • DIONYSODORUS BOEOTUS (.csv) • ANAXIS BOEOTUS (.csv) • ZOILUS AMPHIPOLEITA (.csv) • CEPHISODORUS (.csv) • DEMOPHILUS (.csv) • THEOCRITUS CHIUS (.csv) • DINO (.csv) • HERACLIDES CUMANUS (.csv) • ARISTAGORAS MILESIUS (.csv) • ARISTOTELLES (.csv) • DIOSCORIDES (.csv) • HERACLIDES PONTICUS (.csv) • DICAPARCHUS MESSINIUS (.csv) • ARISTOXENUS TARENTINUS (.csv) • PHANIAS ERESIUS (.csv) • CLEARCHUS SOLENSIS (.csv) • LEO BYZANTIUS (.csv) • LEO ALABANDENSIS (.csv) • LEO PELLAIUS (.csv) • CLYTUS MILESIUS (.csv) • MAEANDRIUS MILESIUS (LEANDER MILESIUS) (.csv) 	<ul style="list-style-type: none"> • DIODORUS PERIEGETA (.csv) • DILYLIUS ATHENIENSIS (.csv) • DEMETRIUS PHALEREUS (.csv) • STRATO LAMPISAGENUS (.csv) • THEODICTES PHASELITA (.csv) • LYCUS RHEGINUS (.csv) • NYMPHODORUS SYRACUSANUS (.csv) • CALLIAS SYRACUSANUS (.csv) • ANTANDER SYRACUSANUS (.csv) • HECATAEUS ARBERTIA (.csv) • PSEUDO-HECATAEUS (.csv) • AMOMETUS (.csv) • MEGASTHENIS (.csv) • DAIMACHUS PLATAEENSIS (.csv) • PATROCLES (.csv) • DEMODAMAS MILESIUS (.csv) • DEMODAMAS HALICARNASSENSIS (.csv) • DEMOCHARIS LEUCONISSIS (.csv) • HIERONYMUS CARDANUS (.csv) • PYRRHUS EPIROTA (.csv) • PROXENUS (.csv) • CINIAS THESSALUS (.csv)

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).

```

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 an 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*.

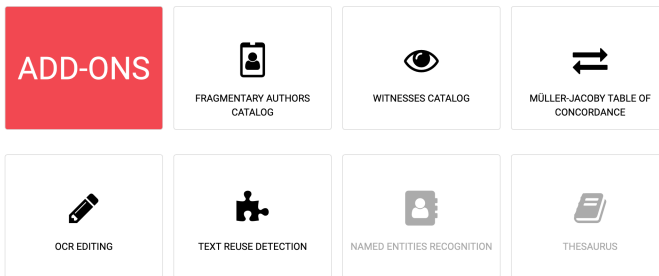



Figure 4.17. DFHG add-ons

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-*

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: Samius¹⁴⁵
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](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 alphabetical order (*Scriptores aetatis incertae ex ordine literarum*).

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. Eutythianus 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

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 Eutythianus 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. Eutythianus Cappadox* and *Magni et Eutythiani fragmenta*. The passage of Malalas includes two sequent sections derived from Magnus Carrhenus (Μάγνος ὁ χρονογράφος ὁ Καρηνός) and Eutythianus Cappadox (Εὐτυθιανός 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, Anaesus, 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, Carthaginien-sis, 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, Epiphaniens-sis, Epirota, Eresius, Eretriensis, Erythraeus, Euboeus, Gadarenus, Halicarnassensis, Heracleens-sis, Heracleota, Hierapolita, Iliensis, Isaurus, Lacedaemonius, Laco, Lampsacenus, Lepreates, Les-bius, Leucadius, Leuconoensis, Lindius, Liparaeus, Lycius, Lydius, Macedo, Magnesius, Male-otes, Mallotes, Mamigonensis, Mantinensis, Mauritanus, Meczybernaeus, Megalopolitanus, Mende-sius, Mesopotamenus, Messenius, Methymnaeus, Milesius, Myndius, Myrleanus, Mytilenaeus, Naucratis, Naucratis, 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, Sardinianus, Scepsius, Sebennyta, Sicu-lus, Sicyonius, Sigeensis, Sinopensis, Solensis, Stymphalius, Syracusanus, Tarentinus, Tarrhaeus, Tarsensis, Tauromenitanus, Tegeata, Teius, Tejus, Tenedius, Thasius, Theangelensis, Thebaeus, The-banus, Thespiensis, Thessalus, Thrax, Thyatirenus, Tiberiensis, Tragilensis, Trallianus, Trapezun-tius, 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, Chal-cis, Chaldaea, Chalkedon, Chios, Chorene, Cnidus, Colophon, Corinthus, Cyme, Cyprus, Cyrene, Cyzicus, Damascus, Delos, Delphi, Dyrrachium, Edessa, Elaea, Elis, Emesa, Ephesos, Epidaurus, 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, Mantinea, Mauritania, Megalopolis, Meczyberna, Mende, Mesopotamia, Messene, Methymna, Mgnesia, Miletus, Myndos, Myrleia, Myti-lene, Naucratis, Neapolis, Nicaea, Nicomedia, Nisibis, Nysa, Oasis Magna, Odessos, Oichalia, Ol-bia, Olynthus, Panion, Panormus, Paros, Patrai, Pella, Peparethus, Pergamum, Perinthus, Petra, Phaleron, Phaselis, Philadelpheia, Pieria, Plataea, Pompeiopolis, Pontus Euxinus, Priene, Procon-nesus, Pygela, Rhegion, Rhodes, Rosetta, Sagalassos, Salamis, Samos, Samothrace, Sardis, Sebenny-tos, 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 ambiguities.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

151 *Alexandrensis* and *Alexandrinus e Troade* for *Alexandria Troas*, *Heracleensis* and *Heracleota* for *Herakleia*, *Lacedaemonius* and *Laco* for *Lacedaemon*, *Maleotes* and *Mallotes* for *Mallos*, *Naucratica* and *Naucraticites* 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 *Pygelenis* (*Democles Pygelenis*, FHG II 20–21). In the first case the Greek form of the epithet is *Οιχαλιώτης* and the corresponding place name is *Οιχαλία* (see Steph. Byz., s.v. *Οιχαλία*), 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 Alexandria* (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 standardized 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

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 requests 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

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.

```

1 <mads:mads xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:mads="http
  ://www.loc.gov/mads/v2" xmlns:xsi="http://www.w3.org/2001/
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  loc.gov/mads/v2 http://www.loc.gov/standards/mads/mads.xsd">
2 <mads:authority>
3   <mads:name type="personal">
4     <mads:namePart>Ister</mads:namePart>
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7   </mads:name>
8 </mads:authority>
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38 <mads:variant type="other" lang="eng">
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42   </mads:name>
43 </mads:variant>

```

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53     <mads:namePart type="termsOfAddress">ho Kallimacheios</mads:
54     namePart>
55     <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
56   </mads:name>
57 </mads:variant>
58 <mads:variant type="other">
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60     <mads:namePart type="termsOfAddress">Kallimachos-Sch&#xFC;ler</
61     mads:namePart>
62     <mads:namePart type="date">3. Jh. v. Chr</mads:namePart>
63   </mads:name>
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68     <mads:namePart type="termsOfAddress">der Kallimacheer</mads:
69     namePart>
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71   </mads:name>
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86   </mads:name>
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91     <mads:namePart type="termsOfAddress">di Cirene</mads:namePart>

```

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          namePart>
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97         </mads:name>
98     </mads:variant>
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102         <mads:namePart type="termsOfAddress">Cyrenaeus</mads:namePart>
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130         </mads:name>
131     </mads:variant>
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    identifier>
139 <mads:fieldOfActivity>Historian</mads:fieldOfActivity>
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141 <mads:url displayLabel="Wikipedia">http://en.wikipedia.org/wiki/
    Istros_the_Callimachean</mads:url>
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    wcidentities/lccn-no2002-7118</mads:url>
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    >
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146 <mads:extension>
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    description>
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161 </mads:mads>

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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-

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 readable 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*.

165 Grieshaber (2019).

166 Rabinowitz/Shaw et al. (2018).

167 An example of this language can be found in the *Suda* [A 2191]: Ἀνδροτίων, Ἰσσοκράτους, Ἀθηναῖος, ῥήτωρ καὶ δημαγωγός, 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).

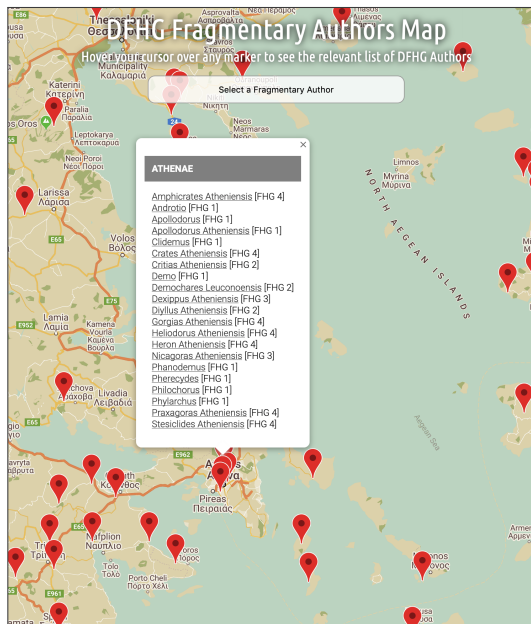


Figure 4.19. DFHG *Fragmentary Authors Map*: Athenae

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

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://www.dfhg-project.org/Fragmentary-Authors-Catalog/map.php?center=Syracusae>.

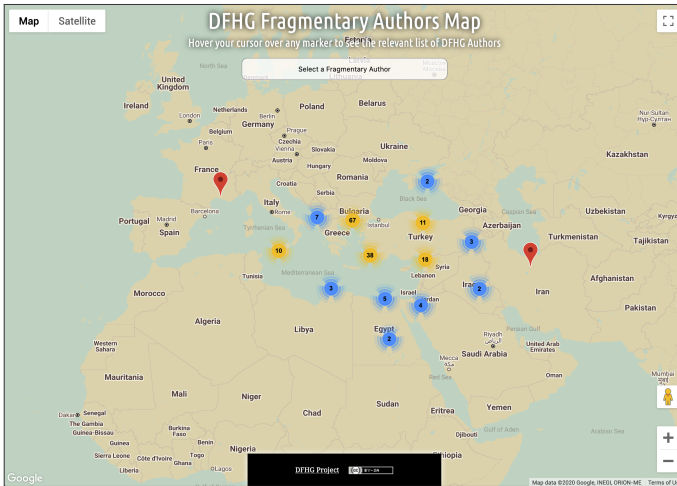



Figure 4.21. DFHG Fragmentary Authors Map: marker clustering


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 fragmentary 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 implementations 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

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.

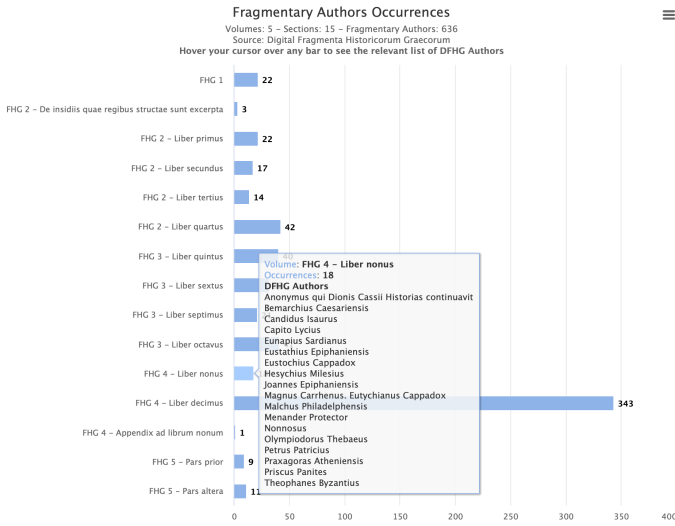


Figure 4.22. DFHG Fragmentary Authors Chart

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:

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/10.1163/1873-5363_bnj_a324). In this case the witness is an entry (“Ἰππάρχος”) 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., Harpocraton;
- 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 Oupput 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.

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 Tattius, 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 Homeric*, 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 Ἰππομάχου), Fabius Planciades Fulgentius, Faustus, Flavius Arrianus, Flavius Claudius Iulianus, Flavius Cresconius Corippus, Flavius Josephus, Flavius Magnus Aurelius Cassiodorus, Flavius Mallius Theodorus, Flavius Philostratus, Flavius Sospater 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, Harpocraton, 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, Lesboux, *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,

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: see p. 230.

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 Nican drum*, *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 Autolyicum*, *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*, *Agasilau*, *Agis*, *Ajax*, *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 Danielelem prophetam liber unus* (PL 25), *Commentariorum in Osee prophetam libri tres* (PL 25), *Commentarium in Dionysii periegetae or-*

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 Platonis 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 differentia, 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 fortuna Romanorum, De garrulitate, De generatione animalium, De Herodoti malignitate, De incredibilibus, De Isaeo, De Iside et Osiride, De iusto, De legibus, De lingua latina, De longaevis, De Lysia, De magistratibus populi romani, De mensibus, De mensuris 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 oraculis, 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 deorum, Dialogi meretricii, Dion, Dissertationes ab Arriano digestae, Divinae institutiones, Divus Augustus, Ecclesiazusae, Ecloga chronographica, Eclogae, Electra, Elementa astronomiae, Encomium in sacrosanctum Christi martyrem beatum Dionysium Areopagitam, Epimerismi Homeric, Epistula 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, Excerpta 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 Ἰππομάχου), Excerpta politiarum, Excerpta Salmasiana, Exegesis in Homeri Iliadem, Expositio sermonum antiquorum, Fabius Maximus, Facta et dicta memorabilia, Gallienus, Geographiae informatio, Geographica, Geoconomica, 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), Historiae adversum paganos, Historiae Alexandri Magni Macedonis, Historiae Armeniacae (3), Historiae mirabiles, Historiae provinciae Taron (2), Historiarum mirabilium collectio, Homiliae, Idyllia, Ilias, In Aristotelis categorias commentarium, In Aristotelis Ethica Nicomachea, In Aristotelis Ethica Nicomachea ii–v commentaria, In Aristotelis libros de anima paraphrasis, In Aristotelis metaphysica 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, Macrobiani, 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 astronomicum, Politica, Polyhistoria, Pompeius, Poplicola, Posthomericum, 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, Thesmophoriazuae, 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 ἀρμονικὰ Πτολεμαίου ὑπόμνημα, Ἴωνιά (Violarium), Παναθηναϊκός (2), Παροιμίαι αἰς Ἀλεξανδρεῖς ἐχρῶντο, Περὶ μονήρους λέξεως, Περὶ στάσεων, Περὶ Στυγός, Πρὸς Πλάτωνα ὑπὲρ τῶν τεττάρων, Σοφιστής, Τῶν σποράδην περὶ ποταμῶν καὶ κρηνῶν καὶ λυμῶν παραδοξολογούμενων, Ὑπὲρ τῶν τεττάρων.

The two lists share the following 29 work titles because they are classified both as `witness_author` and as `witness_work`:

Anthologia Palatina, Appendix proverborum, Argumentum in Sophoclis Oedypum Tyrannum, Argumentum in Theocriti Idyllia VI, Aristee 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 (t1g4099), but also a *Work Title* with a three-digit number (t1g4099.0001).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 (t1g7000), *Appendix proverbiorum* (t1g9007), *Argumentum in Sophoclis Oedypum Tyrannum*, *Argumentum in Theocriti Idyllia VI*, *Aristeae epistula ad Philocratem* (t1g1183), *Certamen Homeri et Hesiodi* (t1g1252), *Chronicon paschale* (t1g2371), *Collectio verborum utilium e differentibus rhetoribus et sapientibus multis*, *Epimerismi Homerici* (t1g5004.001),¹⁸³ *Etymologicum Genuinum* (t1g4097), *Etymologicum Gudianum* (t1g4098), *Etymologicum Magnum* (t1g4099), *Excerpta Eusebiana*, *Excerpta Latina Barbari*, *Excerpta philosophica* (Περὶ Ἰππομάχου), *Excerpta Salmasiana*, *Geponica* (t1g4080), *Glossae rhetoricae* (t1g4289.004),¹⁸⁴ *Lexicon rhetoricum Cantabrigiense* (t1g4301), *Marmor Parium*, *Marmor Rosettanum*, *Proverbia Bodleiana*, *Titi Livii Epitome*, *Veteres glossae verborum iuris*, *Vita Sophoclis* (t1g4318), *Vitae Aeschyli* (t1g4141), *Vitae Arati* (t1g4161), *Vitae Euripidis*, *Vitae Homeri* (t1g1805).

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* (t1g9007) is not in the *Perseus Catalog*.

183 In the TLG *Canon* the *Epimerismi Homerici* (t1g5004.001) are cataloged under the *Epimerismi* (t1g5004).

184 In the TLG the *Glossae rhetoricae* (t1g4289.004) are cataloged under the *Lexica Segueriana* (t1g4289).

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, Vespaë*). 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, especially 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-

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.

Where witness_author="Herodotus"

HERODOTUS
 urn:cite:perseus:author:728
 Historicus - Halicarnassensis (Halicarnassus) , Thurius (Thurii)
 5 B.C.

Historiae
 urn:cts:greekLit:tlg0016.tlg001

PASSAGE	DFHG VOLUME	AUTHOR	WORK	FR.	TEXT REUSE
4.36	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	1	♣
2.143	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	276	♣
2.20.21	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	278	♣
2.73	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	292	♣
2.71	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	293	♣
2.70	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	294	♣
2.15	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	295	♣
2.16	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	296	♣
2.2	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	297	♣
2.45	Volumen primum	HECATAEUS	ΠΕΡΙΟΔΟΣ ΓΗΕ	298	♣
6.137	Volumen primum	HECATAEUS	ΓΕΝΕΑΛΟΓΙΑΙ	362	♣
3.48	Volumen quartum	DIONYSIUS CHALCIDENSIS	ΚΤΙΣΕΙΣ	13	♣

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_author|Herodotus&onoffswitch=on](http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=witness_author|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_author|Dionysius+Halicarnassensis&onoffswitch=on](http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=witness_author|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.							
<i>Ad Ammaeum</i>							
PASSAGE	DFHG VOLUME	AUTHOR	WORK		FR.	TEXT REUSE	
9	Volumen primum	PHILOCHORUS	ATTHIS		132	✚	
11	Volumen primum	PHILOCHORUS	ATTHIS		135	✚	
<i>Antiquitates Romanae</i>							
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

see p. 155. 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 (Κάλλπαι).¹⁸⁸

Stephanus Byzantius|*Ethnica*|Κάλλπαι

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 abbreviations 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 γυναϊκας εὐνοῦχισεν, ὅπως αὐταῖς χρῶτο 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-

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* [II 1168] s.v. Περιθοῖδα:”). 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 *Deipnosophists* of Athenaeus in order to generate stable computational identifiers of the work of the Nucretes: 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	

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*.

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
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 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
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 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
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 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
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 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:stoa0163.stoa001
 urn:cts:latinLit:stoa0167.stoa001
 urn:cts:latinLit:stoa0171.stoa007
 urn:cts:latinLit:stoa0171.stoa009
 urn:cts:latinLit:stoa0186.stoa001
 urn:cts:latinLit:stoa0192a.stoa001

urn:cts:latinLit:stoa0203.stoa001
 urn:cts:latinLit:stoa0264.stoa001
 urn:cts:latinLit:stoa0275.stoa01
 urn:cts:latinLit:stoa0275.stoa009
 urn:cts:latinLit:stoa0275.stoa013
 urn:cts:latinLit:stoa0275.stoa027

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, Byzantium, Caesariensis, Calagurritanus, Carthaginiensis, Carystius, Chaeronensis, Chalcidensis, Chorenensis, Chrysopolitanus, Clagensis, Comensis, Constantiensis (Cypri), Constantinopolitanus, Cordubensis, Creticus, Cyprius, Cyrenaicus, 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, Naucratis, Nicaeensis, Nucerinus, Palaestinus, Panites, Parius, Patavinus, Pellaeus, Pergamenus, Philadelphius, Prieneus, Reatinus, Rhodius, Romanus, Rosettanus, Samosatenus, Samothracenus, Sardinianus, 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–xxiii.

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.

Where author="PHANODEMUS"

ATHENAEUS
 urn:cite-perseus:author.228
 Sophista - Naucratis (Naucratis)
 2-3 A.D.

Deignosopistae
 urn:cts:greekLit:lg008.t1g001

PASSAGE	DFHG VOLUME	AUTHOR	WORK	FR.	TEXT REUSE
9.392d	Volumen primum	PHANODEMUS	ATTHIDIS	1	DA #
3.144c	Volumen primum	PHANODEMUS	ATTHIDIS	5	DA #
10.437c	Volumen primum	PHANODEMUS	FRAGMENTA INCERTAE SEDIS	13	DA #
11.465a	Volumen primum	PHANODEMUS	FRAGMENTA INCERTAE SEDIS	14	DA #
4.168a	Volumen primum	PHANODEMUS	FRAGMENTA INCERTAE SEDIS	15	DA #
1.20a	Volumen primum	PHANODEMUS	FRAGMENTA INCERTAE SEDIS	19	DA #


DIONYSIUS HALICARNASSENSIS
 urn:cite-perseus:author.511
 Historicus, Rhetor - Halicarnassensis (Halicarnassus)
 1 B.C.

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

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|PHANODEMUS&onoffswitch=on](http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=author|PHANODEMUS&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

201 On text reuse detection in the DFHG, see section 4.4.5.

Where work="ATTIKA"

ATHENAEUS
 urn:cite:perseus:author.228
 Sophista - Naucratis (Naucratis)
 2-3 A.D.

Deipnosophistae
 urn:cts:greekLit:lg0008.lg001

PASSAGE	DFHG VOLUME	AUTHOR	WORK	FR.	TEXT REUSE
13.557a	Volumen primum	ISTEER	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 Ἀττικὰ, which is searchable as work and accessible through this link (fig. 4.27):

[http://www.dfhg-project.org/Witnesses-Catalog/index.php?what\[\]=work|ATTIKA&onoffswitch=on](http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=work|ATTIKA&onoffswitch=on)

In this case each passage of each witness lists the *fragmenta* that are classified 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

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

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](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](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|MARMOR+PARIUM&onoffswitch=on](http://www.dfhg-project.org/Witnesses-Catalog/index.php?what[]=author|MARMOR+PARIUM&onoffswitch=on).

Where author="DIONYSIUS HALICARNASSENSIS"

PASSAGE	DFHG VOLUME	AUTHOR	WORK	BOOK	CHAPTER	PARAGRAPH	SUB-PARAGRAPH	TEXT RESSE
12.1	Volumen secundum	DIONYSIUS HALICARNASSENSIS	EK THE ICTOPIAE AIONYZIOY AAIKAPNAEEGE	EK BIBA IE		I		φ
12.2	Volumen secundum	DIONYSIUS HALICARNASSENSIS	EK THE ICTOPIAE AIONYZIOY AAIKAPNAEEGE	EK BIBA IE		II		φ
12.3	Volumen secundum	DIONYSIUS HALICARNASSENSIS	EK THE ICTOPIAE AIONYZIOY AAIKAPNAEEGE	EK BIBA IE		III		φ
12.4	Volumen secundum	DIONYSIUS HALICARNASSENSIS	EK THE ICTOPIAE AIONYZIOY AAIKAPNAEEGE	EK BIBA IE		IV		φ

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 BIBAI-OΘHKHΣ, 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), BIBAI-OΘHKHΣ (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-

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](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),

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="Becker. Anecdota Graeca II. Berolini 1816"							
SCHOLIA IN DIONYSIUM THRACEM							
Scholia							
Varia							
<i>Ars grammatica</i>							
<i>Becker. Anecdota Graeca II. Berolini 1816</i>							
PASSAGE	DFHG VOLUME	AUTHOR	WORK			FR.	TEXT REUSE
p. 783	Volumen primum	HECATAEUS	ΓΕΝΕΑΛΟΓΙΑΙ			361	φ-
p. 783	Volumen secundum	DIONYSIUS MILESIUS				1	φ-
p. 783	Volumen secundum	ANAXIMANDER MILESIUS	ΗΡΩΟΛΟΓΙΑ			2	φ-
p. 783.1	Volumen secundum	ARISTOTELES	(ΕΥΦΡΑΤΑ)			256	φ-
p. 782.19	Volumen secundum	MENEGRATES OLYNTHIUS				5	φ-
p. 782	Volumen secundum	DURIS SAMIUS	ΙΣΤΟΡΙΑΙ			16	φ-
p. 783.15	Volumen tertium	MNASEAS PATRENSIS	INCERTAE SEDIS			44	φ-
p. 786	Volumen tertium	MNASEAS PATRENSIS	INCERTAE SEDIS			44	
p. 783.14	Volumen quartum	DOSIADES	ΚΡΗΤΙΚΑ			4	φ-
p. 782.17	Volumen quartum	MENANDER EPHESIUS	ΦΘΙΝΙΚΑ			5	φ-
p. 783.6	Volumen quartum	PHILLIS DELIUS	ΠΕΡΙ ΧΡΟΝΩΝ			1	φ-


Figure 4.29. DFHG *Witnesses Catalog*: Becker. *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.

219 The URN of the entire manuscript is `urn:nbn:de:bsz:16-diglit-3033` and the DOI is `https://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 *Pleaidēs* 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 brackets (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.

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.

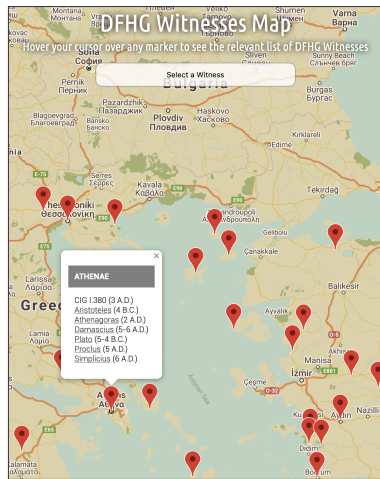



Figure 4.30. DFHG Witnesses Map: Athenae

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) chart²²³ 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

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, Χαλδαικά; Hellenicus, 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, fr. 59–61; Joannes Antiochenus, fr. 2, 4, 6, 8, 11, 13, 15, 17, 20, 217, 218; Mnaseas Patrensis, fr. 27; Phlegon Trallianus, fr. 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

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.

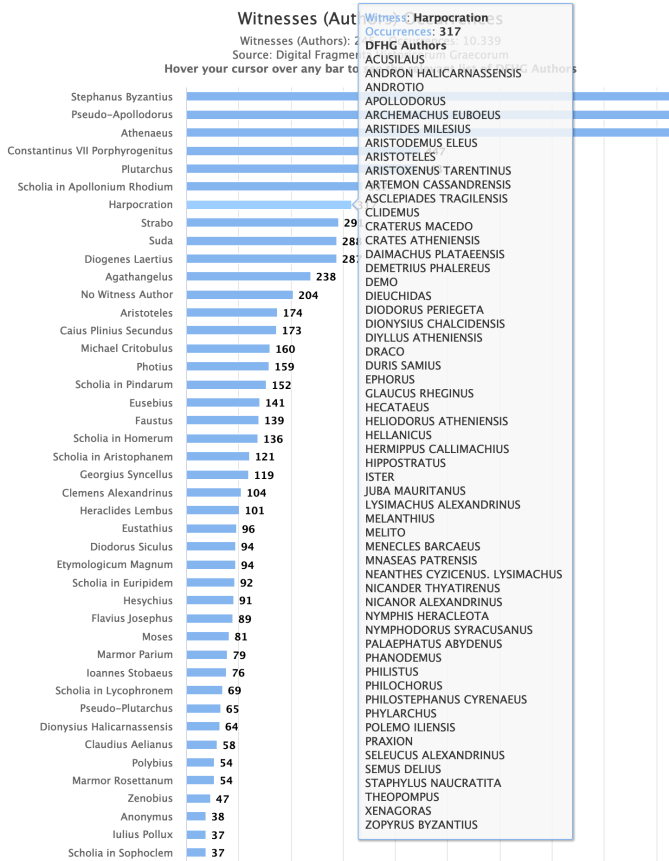


Figure 4.31. DFHG Witnesses (Authors) Chart: Harpocration

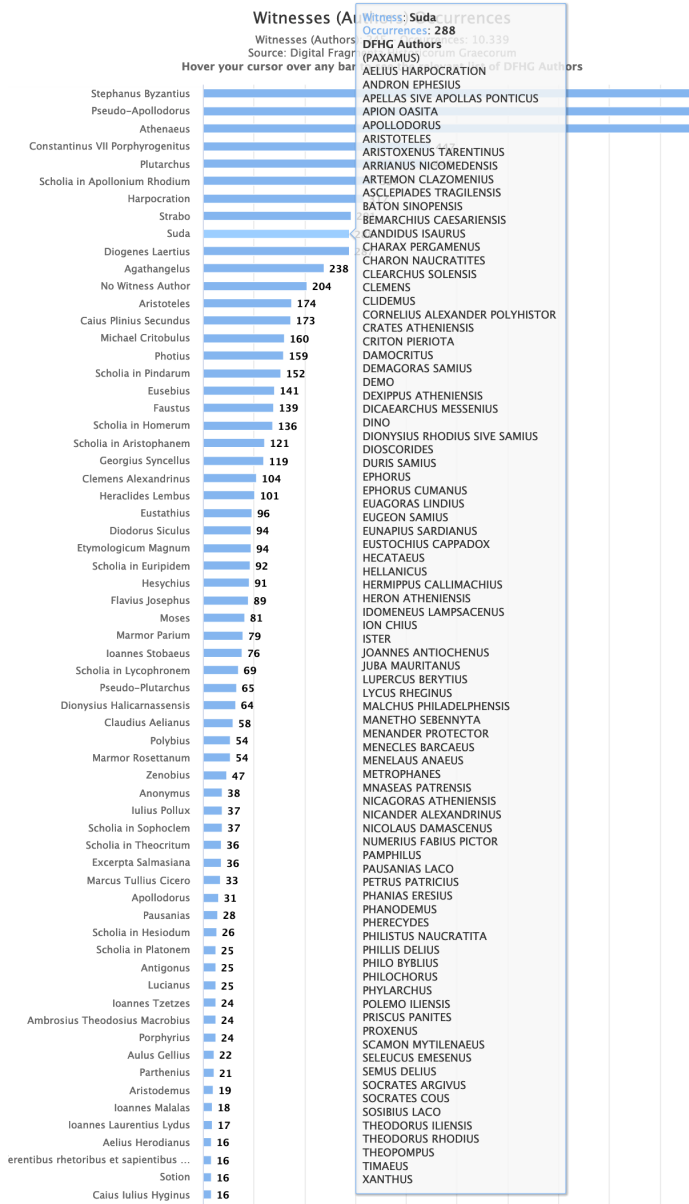


Figure 4.32. DFHG Witnesses (Authors) Chart: Suda

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 Byzantium (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 Historiarum 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

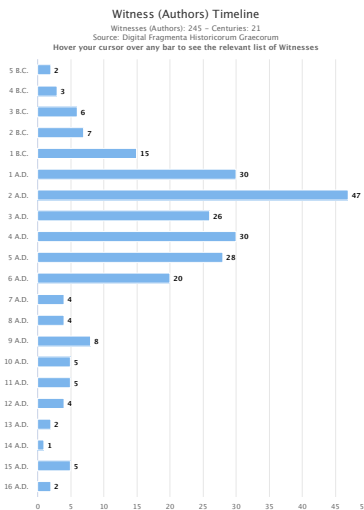


Figure 4.33. DFHG *Witnesses (Authors) Timeline*

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

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 Alexandria	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

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

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 *Aristonikus Tarentinus* (FHG IV 337), and fr. 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. (Philialus) 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. Abrom 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. Agrotas (762)
8. Acestorodorus vel Acestorides	8. Aelius Serenus (1082)	8. Abaris (34)	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 Dios	12. Agatharchides von Samos (284)	12. Agatharchides of Knidos (86)	12. Androkles (751)
13. Aelius Harpocration	13. Agathemerros (2102)	13. Agatharchides of Samos (284)	13. Andronikos of Laodikeia (575A)
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) (575B)
16. Aethlius Samius			
17. Agaclytus			
18. Agathange			

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 OCR'd 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 OCR'd as part of the *Open Greek and Latin* project, the output of the FHG has not been proofread and still


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.

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 *OCREditing* 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.

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 available 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-

254 See section 2.3.1.

255 This algorithm is used also as part of the project *Passim*: <https://github.com/dasmiq/passim/tree/master/src/main/java/JAligner>.

256 For both collections see <https://github.com/PerseusDL> and <http://opengreeklatin.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 (οἷ instead of οἴ), absence of punctuation (πέριξ instead of πέριξ, and κυκλοτερέα instead of κυκλοτερέα,) and a different accent with absence of a particle (τῆν instead of τῆν 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

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 evaluating 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.

TEXT REUSE DETECTION

Γελοῦ δὲ ὄρεων γῆς περιόδους γράφοντας πολλοὺς ἤδη καὶ οὐδένα νόον ἔχοντας ἐξηγησάμενον· οἱ Ὀκεανὸν τε μέγαντα γράφουσι περίξ, τὴν τε γῆν ἔδωσαν κυκλωτέρη, ὡς ἀπὸ τόνου, καὶ τὴν Ἀσίην τῇ Εὐρώπῃ ποιούντων ἴσην.

<https://raw.githubusercontent.com/PerseusDL/canonical-greek1>

Herodotus - The Histories [tlg0016.tlg001.perseus-grc2] (PERSEUS)

Searching HECATAEUS fr. 1 [Herodotus]

Γελοῦ δὲ ὄρεων γῆς περιόδους γράφοντας πολλοὺς ἤδη καὶ οὐδένα νόον ἔχοντας ἐξηγησάμενον· οἱ Ὀκεανὸν τε μέγαντα γράφουσι περίξ, τὴν τε γῆν ἔδωσαν κυκλωτέρη, ὡς ἀπὸ τόνου, καὶ τὴν Ἀσίην τῇ Εὐρώπῃ ποιούντων ἴσην.

Found in Herodotus - The Histories

γελοῦ δὲ ὄρεων γῆς περιόδους γράφοντας πολλοὺς ἤδη καὶ οὐδένα νοονεχόντως ἐξηγησάμενον· οἱ Ὀκεανὸν τε μέγαντα γράφουσι περίξ τῇ γῆν ἔδωσαν κυκλωτέρη, ὡς ἀπὸ τόνου, καὶ τὴν Ἀσίην τῇ Εὐρώπῃ ποιούντων ἴσην. ἐν ὀλίγοισι γὰρ ἐγὼ δηλώσω μεγάθος τε ἐκάστης αὐτέων καὶ οἷα τις ἐστὶ ἐξ γραφῆν ἐκάστη.

```
<div type="textpart" subtype="section" n="2">
<p>
<span ana="DFHG">
<p>
γελοῦ δὲ ὄρεων γῆς περιόδους γράφοντας πολλοὺς ἤδη καὶ οὐδένα νοονεχόντως ἐξηγησάμενον· οἱ Ὀκεανὸν τε μέγαντα γράφουσι περίξ τῇ γῆν ἔδωσαν κυκλωτέρη, ὡς ἀπὸ τόνου, καὶ τὴν Ἀσίην τῇ Εὐρώπῃ ποιούντων ἴσην. ἐν ὀλίγοισι γὰρ ἐγὼ δηλώσω μεγάθος τε ἐκάστης αὐτέων καὶ οἷα τις ἐστὶ ἐξ γραφῆν ἐκάστη.
</p>
</div>
```

Figure 4.38. DFHG Text Reuse Detection: Hdt. 4.36

TEXT REUSE DETECTION

Alexander, transmissio Oresarte amne, quem arbitrabatur esse Tanaim, fusus Scythas ad 100 stadia est insectatus: Ἐνταῦθα δὲ πρὸς αὐτὸν ἀμείσθαι τὴν Ἀμαζῶνα οἱ πολλοὶ λέγουσιν, ὧν καὶ Κλειταρχὸς ἐστὶ καὶ Πολύκριτος, καὶ Οὐρησικριτος, καὶ Ἀντιγένης, καὶ Ἰστρος.

<https://raw.githubusercontent.com/PerseusDL/canonical-greek1>

Plutarch - Alexander [tlg0007.tlg047.perseus-grc2] (PERSEUS)

Searching ISTER fr. 64 [Plutarchus]

Alexander, transmissio Oresarte amne, quem arbitrabatur esse Tanaim, fusus Scythas ad 100 stadia est insectatus: Ἐνταῦθα δὲ πρὸς αὐτὸν ἀμείσθαι τὴν Ἀμαζῶνα οἱ πολλοὶ λέγουσιν, ὧν καὶ Κλειταρχὸς ἐστὶ καὶ Πολύκριτος, καὶ Οὐρησικριτος, καὶ Ἀντιγένης, καὶ Ἰστρος.

Found in Plutarch - Alexander

ἐνταῦθα δὲ πρὸς αὐτὸν ἀμείσθαι τὴν Ἀμαζῶνα οἱ πολλοὶ λέγουσιν, ὧν καὶ Κλειταρχὸς ἐστὶ καὶ Πολύκριτος καὶ Οὐρησικριτος καὶ Ἀντιγένης καὶ Ἰστρος Ἀριστόβουλος δὲ καὶ Χάρης ὁ εἰσαγγελεὺς καὶ Πτολεμαῖος καὶ Ἀντικλείδης καὶ Φίλων ὁ θηβαῖος καὶ Φίλιππος ὁ θαγαγελεύς, πρὸς δὲ ταύτους Ἐκαταῖος ὁ Ἐρετριεὺς καὶ Φίλιππος ὁ Χαλκιδικεὺς καὶ Δωδρεὶς ὁ Σάμιος πλάσμα φασι γεγενῆσθαι ταῦτο.

```
<div type="textpart" subtype="section" n="1">
<p>
<span ana="DFHG">
ἐνταῦθα δὲ πρὸς αὐτὸν ἀμείσθαι τὴν Ἀμαζῶνα οἱ πολλοὶ λέγουσιν, ὧν καὶ
Κλειταρχὸς ἐστὶ καὶ Πολύκριτος καὶ Οὐρησικριτος καὶ Ἀντιγένης καὶ Ἰστρος
Αριστόβουλος δὲ καὶ Χάρης ὁ εἰσαγγελεὺς καὶ Πτολεμαῖος καὶ Ἀντικλείδης καὶ
Φίλων ὁ θηβαῖος καὶ Φίλιππος ὁ θαγαγελεύς, πρὸς δὲ ταύτους Ἐκαταῖος ὁ
Ἐρετριεὺς καὶ Φίλιππος ὁ Χαλκιδικεὺς καὶ Δωδρεὶς ὁ Σάμιος πλάσμα φασι
γεγενῆσθαι ταῦτο.
</p>
</div>
```

Figure 4.39. DFHG Text Reuse Detection: Plut., Alex. 46

TEXT REUSE DETECTION

Παράκειται δ' αὐτῷ (τῷ Τισσηῶ) Κιθαίρων ὄρος, ὀνομαζόμενον δὲ πρότερον Ἀστέριον, δι' αἰτίαν τοιαύτην. Βοιωτῶ δὲ τοῦ Ποσειδῶνος ἐκ δυοῖν γυναικῶν τῶν ἐπισημῶν θέλοντος γῆμαι τὴν ὠφελιωτέραν, καὶ ἐν ταῖς ἀκρωρείαις λόφου τινὸς ἀνωάνου νυκτὸς περιμένοντος ἀμφοτέρως, αἰφνιδίως ἐξ οὐρανοῦ κατενεχθεὶς ἀστήρ ἔπεσε τοῖς Εὐρυθεμιστῆς ὤμοις, καὶ ἀφανὴς ἐγένετο. Βοιωτὸς δὲ τὸ σημανόμενον νοήσας, τὴν μὲν κόρην ἐγγίμει, τὸ δ' ὄρος ὠνόμασεν

<https://raw.githubusercontent.com/OpenGreekAndLatin/First1K>

Pseudo-Plutarch - De Fluviis [tlg0094.tlg001.1st1k-grc1.xml] (OGL)

Searching LEO BYZANTIUS fr. 2 [Pseudo-Plutarchus]

Παράκειται δ' αὐτῷ (τῷ Τισσηῶ) Κιθαίων ὄρος, ὀνομαζόμενον δὲ πρότερον Ἀστέριον, δι' αἰτίαν τοιαύτην. Βοιωτῶ τοῦ Ποσειδῶνος ἐκ δυοῖν γυναικῶν τῶν ἐπισημῶν θέλοντος γῆμαι τὴν ὠφελιωτέραν, καὶ ἐν ταῖς ἀκρωρείαις λόφου τινὸς ἀνωάνου νυκτὸς περιμένοντος ἀμφοτέρως, αἰφνιδίως ἐξ οὐρανοῦ κατενεχθεὶς ἀστήρ ἔπεσε τοῖς Εὐρυθεμιστῆς ὤμοις, καὶ ἀφανὴς ἐγένετο. Βοιωτὸς δὲ τὸ σημανόμενον νοήσας, τὴν μὲν κόρην ἐγγίμει, τὸ δ' ὄρος ὠνόμασεν Ἀστέριον ἀπὸ τοῦ συγκυρήματος. Ὑστερον δ' ἐκλήθη Κιθαίων δι' αἰτίαν τοιαύτην. Τισσάφνη μία τῶν Ἐρινυῶν, εἰς ἐπιθυμίαν ἐμπεσοῦσα παιδὸς εὐπρεποῦς, Κιθαίρωνος τοῦνομια, καὶ μὴ στέγουσα τὴν ἐπίτασιν τῶν ἐρώτων, λόγους αὐτῷ περὶ συνόδων ἀπέστειλεν- ὁ δὲ τὸ καταπληκτικὸν τῆς προειρημένης φοβηθεὶς, οὐδ' ἀποκρίσας αὐτὴν ἤξιωσεν- ἢ ἀποτυχούσα τῆς προαιρέσεως, ἐκ τῶν πλοκάμων ἕνα τῶν δρακόντων ἀπέσπασεν, καὶ ἐπὶ τὸν ὑπερήσανον ἐβαλεν- ὁ δ' ὄφις τοῖς κόλποις περισφίγγας αὐτὸν ἀνέλεν, Ἀστέριον ποιμαίνοντος ἐν ταῖς ἀκρωρείαις. Κατὰ δὲ πρόνοιαν θεῶν, τὸ ὄρος ἀπ' αὐτοῦ μετωνομάσθη Κιθαίων, καθὼ ἱστορεῖ Ἀλέων ὁ Βυζάντιος ἐν τοῖς Βοιωτικαῖς.

Found in Pseudo-Plutarch - De Fluviis

Παράκειται δ' αὐτῷ (τῷ Τισσηῶ) Κιθαίων ὄρος, ὀνομαζόμενον δὲ πρότερον Ἀστέριον, δι' αἰτίαν τοιαύτην. Βοιωτῶ τοῦ Ποσειδῶνος ἐκ δυοῖν γυναικῶν τῶν ἐπισημῶν θέλοντος γῆμαι τὴν ὠφελιωτέραν, καὶ ἐν ταῖς ἀκρωρείαις λόφου τινὸς ἀνωάνου νυκτὸς περιμένοντος ἀμφοτέρως, αἰφνιδίως ἐξ οὐρανοῦ κατενεχθεὶς ἀστήρ ἔπεσε τοῖς Εὐρυθεμιστῆς ὤμοις, καὶ ἀφανὴς ἐγένετο. Βοιωτὸς δὲ τὸ σημανόμενον νοήσας, τὴν μὲν κόρην ἐγγίμει, τὸ δ' ὄρος ὠνόμασεν Ἀστέριον ἀπὸ τοῦ συγκυρήματος. Ὑστερον δ' ἐκλήθη Κιθαίων δι' αἰτίαν τοιαύτην. Τισσάφνη μία τῶν Ἐρινυῶν, εἰς ἐπιθυμίαν ἐμπεσοῦσα παιδὸς εὐπρεποῦς, Κιθαίρωνος τοῦνομια, καὶ μὴ στέγουσα τὴν ἐπίτασιν τῶν ἐρώτων, λόγους αὐτῷ περὶ συνόδων ἀπέστειλεν- ὁ δὲ τὸ καταπληκτικὸν τῆς προειρημένης φοβηθεὶς, οὐδ' ἀποκρίσας αὐτὴν ἤξιωσεν- ἢ ἀποτυχούσα τῆς προαιρέσεως, ἐκ τῶν πλοκάμων ἕνα τῶν δρακόντων ἀπέσπασεν, καὶ ἐπὶ τὸν ὑπερήσανον ἐβαλεν- ὁ δ' ὄφις τοῖς κόλποις περισφίγγας αὐτὸν ἀνέλεν, Ἀστέριον ποιμαίνοντος ἐν ταῖς ἀκρωρείαις. Κατὰ δὲ πρόνοιαν θεῶν, τὸ ὄρος ἀπ' αὐτοῦ μετωνομάσθη Κιθαίων, καθὼ ἱστορεῖ Ἀλέων ὁ Βυζάντιος ἐν τοῖς Βοιωτικαῖς.

```
<div type="textpart" subtype="section" n="2">
<p ana="DFHG">2. Παράκειται δὲ αὐτῷ Κιθαίων ὄρος, ὀνομαζόμενον
δὲ πρότερον Ἀστέριον δι' αἰτίαν τοιαύτην. Βοιωτῶ
τοῦ Ποσειδῶνος ἐκ δυοῖν γυναικῶν τῶν ἐπισημῶν
θέλοντος γῆμαι τὴν ὠφελιωτέραν καὶ ἐν ταῖς ἀκρωρείαις
λόφου τινὸς ἀνωάνου νυκτὸς περιμένοντος ἀμφοτέρως,
<p b n="640"/>
αἰφνιδίως ἐξ οὐρανοῦ κατενεχθεὶς ἀστήρ ἐπέπεσε
τοῖς Εὐρυθεμιστῆς ὤμοις καὶ ἀφανὴς ἐγένετο.
```

Figure 4.40. DFHG Text Reuse Detection: [Plut.], *De fluv.* 2.2

TEXT REUSE DETECTION

Clam dare operam coepit (Conon), ut Ioniam et Aeoliam restitueret Atheniensibus. Id quum minus diligenter esset velatum, Tiribazus, qui Sardibus proeerat, Cononem evocavit, simulans ad regem eum se mittere velle magna de re. Hujus nuntio parens quum venisset, in vincula coniectus est, in quibus aliquamdiu fuit. Inde nonnulli eum ad regem abductum ibique perisse scriptum reliquerunt. Contra ea Dinon historicus, cui nos plurimum de rebus Persicis credimus, effugisse scripsit; illud addubitat, utrum Tiribazo sciente, an imprudente sit factum.

[https://raw.githubusercontent.com/PerseusDL/canonical-latinLit/](https://raw.githubusercontent.com/PerseusDL/canonical-latinLit/master/data/phi0588/abo009/phi0588.abo009.perseus-lat2.xml)

Submit

<https://raw.githubusercontent.com/PerseusDL/canonical-latinLit/master/data/phi0588/abo009/phi0588.abo009.perseus-lat2.xml>

Searching

Clam dare operam coepit (Conon), ut Ioniam et Aeoliam restitueret Atheniensibus. Id quum minus diligenter esset velatum, Tiribazus, qui Sardibus proeerat, Cononem evocavit, simulans ad regem eum se mittere velle magna de re. Hujus nuntio parens quum venisset, in vincula coniectus est, in quibus aliquamdiu fuit. Inde nonnulli eum ad regem abductum ibique perisse scriptum reliquerunt. Contra ea Dinon historicus, cui nos plurimum de rebus Persicis credimus, effugisse scripsit; illud addubitat, utrum Tiribazo sciente, an imprudente sit factum.

Found in source text

huic, quod ceteris mortalibus, ut inconsideration in secunda quam in adversa esset fortuna. nam classe Peloponnesiorum devicta, cum ultum se iniurias patriae putaret, plura concupivit quam efficere potuit. neque tamen ea non pia et probanda fuerunt, quod potius patriae opes augeri quam regis maluit. nam cum magnam auctoritatem sibi pugna illa navali, quam apud Cnidum fecerat, constituisset non solum inter barbaros, sed etiam omnes Graeciae civitates, **clam dare operam coepit, ut Ioniam et Aeoliam restitueret Atheniensibus, id cum minus diligenter esset celatum, Tiribazus, qui Sardibus praererat, Cononem evocavit, simulans ad regem eum se mittere velle magna de re. huius nuntio parens cum venisset, in vincula coniectus est, in quibus aliquamdiu fuit. inde nonnulli eum ad regem abductum ibique eum perisse scriptum reliquerunt. contra ea Dinon historicus, cui nos plurimum de Persicis rebus credimus, effugisse scripsit: illud addubitat, utrum Tiribazo sciente an imprudente sit factum.**

```
<div type="textpart" subtype="chapter" n="5"><p ana="DFHG"><seg type="section" n="1">Accidit huic, quod ceteris mortalibus, ut inconsideration in secunda quam in adversa esset fortuna. nam classe Peloponnesiorum devicta, cum ultum se iniurias patriae putaret, plura concupivit quam efficere potuit. </seg> <seg type="section" n="2"> neque tamen ea non pia et probanda fuerunt, quod potius patriae opes augeri quam regis maluit. nam cum magnam auctoritatem sibi pugna illa navali, quam apud Cnidum fecerat, constituisset non solum inter barbaros, sed etiam omnes Graeciae civitates, clam dare operam coepit, ut Ioniam et Aeoliam restitueret Atheniensibus. </seg> <seg type="section" n="3"> id cum minus diligenter esset celatum, Tiribazus, qui Sardibus praererat, Cononem evocavit, simulans ad regem eum se mittere velle magna de re. huius nuntio parens cum venisset, in vincula coniectus est, in quibus aliquamdiu fuit. </seg> <seg type="section" n="4"> inde nonnulli eum ad regem abductum ibique eum perisse scriptum reliquerunt. contra ea Dinon historicus, cui nos plurimum de Persicis rebus credimus, effugisse scripsit: illud addubitat, utrum Tiribazo sciente an imprudente sit factum. </seg></p></div>
```

Download XML file...

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 *Βοιωτικά* 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*

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/phi0588.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 Romanae* [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 Navigatione* [tlg0083.tlg003.1st1K-grc1.xml] (OGL)
 - Dionysius of Halicarnassus – *Antiquitates 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 ecclesiastica* [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, Volume III* [tlg7000.tlg001.perseus-grc3] (PERSEUS)
 - Greek Anthology – *Greek Anthology, Volume 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 parasiticam* [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 Samosatenuus – *De parasito sive artem esse parasiticam* [tlg0062.tlg030.1st1K-grc1.xml] (OGL)
- Parthenius of Nicaea – *Narrationes Amatoriae* [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 disserendum*
[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)
- Polyaeus – *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.

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

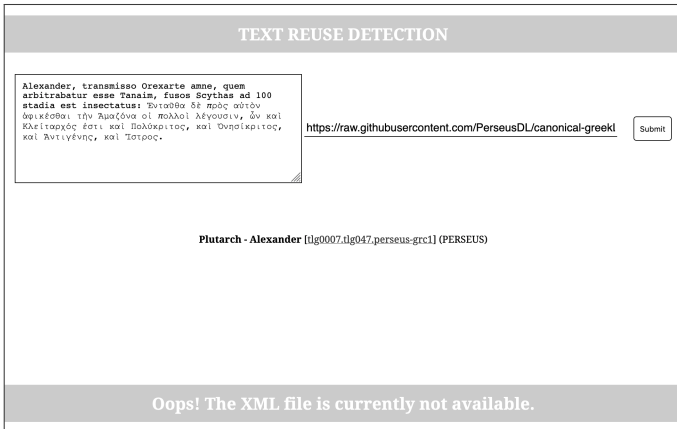


Figure 4.42. DFHG Text Reuse Detection: error message

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

266 See http://www.dfhg-project.org/text_reuse_detection/Witnesses_vs_Digital_Libraries_check.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.

DFHG Witnesses Catalog - Text Reuse Detection

OR

Submit

If don't have an XML file URL, you can choose one of the following editions:

Harpocration, Valerius - Lexicon in decem oratores Atticos [tlg1389.tlg001.perseus-grc2] (PERSEUS)

Submit

Plutarch - Theseus [tlg0007.tlg001.perseus-grc2] (PERSEUS)

Submit

Athenaeus - Deipnosophistae [tlg0008.tlg001.perseus-grc3] (PERSEUS)

Submit

Athenaeus - The Deipnosophists [tlg0008.tlg001.perseus-grc4] (PERSEUS)

Submit

Diogenes Laertius - Lives of Eminent Philosophers [tlg0004.tlg001.perseus-grc1] (PERSEUS)

Submit

Pseudo-Plutarch - De musica [tlg0094.tlg002.perseus-grc1] (PERSEUS)

Submit

Eusebius - Praeparatio Evangelica [tlg2018.tlg001.opp-grc1.xml] (OGL)

Submit

Plutarch - Quaestiones Romanae [tlg0007.tlg084a.perseus-grc1] (PERSEUS)

Submit

Plutarch - Quaestiones Romanae [tlg0007.tlg084a.perseus-grc2] (PERSEUS)

Submit

Plutarch - Quaestiones Graecae [tlg0007.tlg084b.perseus-grc1] (PERSEUS)

Submit

Plutarch - Quaestiones Graecae [tlg0007.tlg084b.perseus-grc2] (PERSEUS)

Submit

Plutarch - Alexander [tlg0007.tlg047.perseus-grc1] (PERSEUS)

Submit

Plutarch - Alexander [tlg0007.tlg047.perseus-grc2] (PERSEUS)

Submit

Aelian - De Natura Animalium [tlg0345.tlg001.perseus-grc1] (PERSEUS)

Submit

Figure 4.43. DFHG *Witnesses Catalog*: text reuse detection (Ister)

DFHG Witnesses Catalog - Text Reuse Detection

OR

Submit

Where author="ISTER"

Harpocraton, Valerius - Lexicon in decem oratores Atticos (t1g1389,t1g001.perseus-grc2)

Searching ISTER fr.3 [Harpocraton]

Λαμπάς. ... Τρεῖς ἄγουσιν Ἀθηναῖοι ἑορτάς λαμπάδος (Λαμπάδος cod. Angl.), Παναθηναίους, καὶ Ἥφαιστείους, καὶ Προμηθεῖος, ὡς Πολέμων φησὶν ἐν τῷ περὶ τῶν ἐν τοῖς προπυλαίοις πινάκων. Ἴστρος δ' ἐν πρώτῃ τῶν Ἀτθίδων, εἰπὼν ὡς ἐν τῇ τῶν Ἀπατουρίων ἑορτῇ Ἀθηναίων οἱ καλλίστας στολὰς ἐνδεδυκότες, λαβόντες ἡμένας λαμπάδας ἀπὸ τῆς ἐστίας, ὕμνουσι τὸν Ἥφαιστον θύοντες (sic codd.; Valesius θέοντες), ὑπόμνημα τοῦ κατανοήσαντα τὴν χρεῖαν τοῦ πυρός διδάξει τοὺς ἄλλους.

Found in Harpocraton, Valerius - Lexicon in decem oratores Atticos

ΛΑΜΠΑΔΑΣ Λυσίας ἐν τῷ κατ' Εὐφήμου. τρεῖς ἄγουσιν Ἀθηναῖοι ἑορτάς λαμπάδος, Παναθηναίους καὶ Ἥφαιστείους καὶ Προμηθεῖος, ὡς Πολέμων φησὶν ἐν τῷ περὶ τῶν ἐν τοῖς προπυλαίοις πινάκων. Ἴστρος δ' ἐν α τῶν Ἀτθίδων, εἰπὼν ὡς ἐν τῇ τῶν Ἀπατουρίων ἑορτῇ Ἀθηναίων οἱ καλλίστας στολὰς ἐνδεδυκότες, λαβόντες ἡμένας λαμπάδας ἀπὸ τῆς ἐστίας, ὕμνουσι τὸν Ἥφαιστον θέοντες, ὑπόμνημα τοῦ κατανοήσαντα τὴν χρεῖαν τοῦ πυρός διδάξει τοὺς ἄλλους.

```
<div xml:id="lampas" type="textpart" subtype="entry" org="uniform" sample="complete" part="N" n="lampas">
<head>ΛΑΜΠΑΔΑΣ</head>
<p ana="DFHG"> Λυσίας ἐν τῷ κατ' Εὐφήμου. τρεῖς ἄγουσιν Ἀθηναῖοι ἑορτάς λαμπάδος, Παναθηναίους
καὶ Ἥφαιστείους καὶ Προμηθεῖος, <pb n="p.190"/> ὡς Πολέμων φησὶν ἐν τῷ περὶ τῶν ἐν
τοῖς προπυλαίοις πινάκων. Ἴστρος δ' ἐν <num>α</num> τῶν Ἀτθίδων, εἰπὼν ὡς ἐν τῇ
τῶν Ἀπατουρίων ἑορτῇ Ἀθηναίων οἱ καλλίστας στολὰς ἐνδεδυκότες, λαβόντες ἡμένας
λαμπάδας ἀπὸ τῆς ἐστίας, ὕμνουσι τὸν Ἥφαιστον θέοντες, ὑπόμνημα τοῦ κατανοήσαντα
τὴν χρεῖαν τοῦ πυρός διδάξει τοὺς ἄλλους. </p>
</div>
```

Searching ISTER fr.5 [Harpocraton]


Θεοῖνα· Λυκοῦργος ἐν τῇ διαδικασίᾳ Κροκωνιδῶν πρὸς Κοιρωνίδας. Τὰ κατὰ δῆμους Διονύσια Θεοῖνα ἐλέγγο, ἐν οἷς οἱ γεννητὰ ἐπέθειον. Τὸν γὰρ Διόνυσσον θέοινον ἔλεγον, ὡς δημοῖ Αἰσχύλος καὶ Ἴστρος ἐν α Συναγωγῶν.

Found in Harpocraton, Valerius - Lexicon in decem oratores Atticos

ΘΕΟΙΝΙΟΝ Λυκοῦργος ἐν τῇ διαδικασίᾳ Κροκωνιδῶν πρὸς Κοιρωνίδας. τὰ κατὰ δῆμους Διονύσια Θεοῖνα ἐλέγγο, ἐν οἷς οἱ γεννητὰ ἐπέθειον: τὸν γὰρ Διόνυσσον θέοινον ἔλεγον, ὡς δημοῖ Αἰσχύλος καὶ Ἴστρος ἐν α Συναγωγῶν.

```
<div xml:id="theoinion" type="textpart" subtype="entry" org="uniform" sample="complete" part="N" n="theoinion">
```


Figure 4.44. DFHG Witnesses Catalog: text reuse detection (Ister in Valerius Harpocraton)

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

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](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.

DIGITAL ATHENAEUS

Digital Athenaeus
G. Kaibel: Athenaei Naucraticae Dipnosophistarum libri 15

Περὶ δὲ τῆς γενέσεως αὐτῶν (ὀρτύγων) Φανόδημος ἐν δεῖ: 9 0.4 Submit

Book 9

Paragraph 47

καθόλου ἐπὶ τῶν εἰς υξ ληγόντων ὀνομάτων ἐζήτηται τί διή ποτε τῶ αὐτῶ οὐ χρώνται ἐπὶ γενικῆς συμφώνῃ τῆς τελευταίας συλλαβῆς τυπωτικῶ (λέγω δὲ ὄνουξ καὶ ὄρτυξ), τὰ δὲ εἰς ἀρσενικά ἀπλά δισσυλλαβὰ ὅταν τῶ υ παρεδρεύηται, ἔχη δὲ τῆς τελευταίας συλλαβῆς ἄρχον ἐν τι τῶν ἀμεταβόλων ἢ δι' ὧν ἡ πρώτη συζυγία τῶν βαρυτόνων λέγεται, διὰ τοῦ κ ἐπὶ γενικῆς κλίνεται, κήρυκος, πέλυκος, Ἐρυκος, Βέβρυκος, ὅσα δὲ μὴ τούτων ἔχει τὸν χαρακτήρα, διὰ τοῦ γ, ὄρτυγος, ὄρυγος, κόκυγος, σημειώδες δὲ τὸ ὄνουξος, καθόλου τε τῆ πληθυντικῆ εὐθεία ἐπομένη ἢ ἐνικῆ γενικῆ χρῆται τῶ αὐτῶ συμφώνῃ τῆς τελευταίας τυπωτικῶ, κἂν ἄνευ συμφώνου λέγηται, ὁμοίως Ἀριστοτέλης δὲ φησιν· ὁ ὄρτυξ ἐστὶ μὲν τῶν ἔκτοπιζόντων καὶ σχιδανοπόδιον, νεοττιῶν δὲ οὐ ποιεῖ, ἀλλὰ κόνιστρον· καὶ ταύτην σκεπάζει φρυγάνοις διὰ τοὺς ἰέρακας, ἐν ἡ ἐπιβάσει. Ἀλέξανδρος δ' ὁ Μύνδιος ἐν δευτέρῳ περὶ ζῶων ὁ θήλυς, φησὶν, ὄρτυξ λεπτοτράχηλος ἐστὶ τοῦ ἄρρενος οὐκ ἔχων τὰ ὑπὸ τῶ γενεῖω μέλανα. ἀνατμηθεὶς δὲ πρόλοβον οὐχ ὀράται μέγαν ἔχων, καρδίαν δ' ἔχει μεγάλην, καὶ ταύτην τρίλοβον. ἔχει δὲ καὶ ἦπαρ καὶ τὴν χολὴν ἐν τοῖς ἐντέροις κεκολλημένην, σπλήνα μικρὸν καὶ δυσθεώρητον, ὄρχεις δὲ ὑπὸ τῶ ἦπατι ὡς ἀλεκτρούνας. **περὶ δὲ τῆς γενέσεως αὐτῶν Φανόδημος ἐν δευτέρῳ Ἀθιδος φησὶν· ὡς κατεῖδεν Ἐρυσίχθων Δῆλον τὴν νῆσον τὴν ὑπὸ τῶν ἀρχαίων καλουμένην Ὀρτυγίαν παρ' ὅ τὰς ἀγέλας τῶν ζῶων τούτων φερομένας ἐκ τοῦ πελάγους ἰζάνειν εἰς τὴν νῆσον διὰ τὸ εὐορμον εἶναι** ... Εὐδοξος δ' ὁ Κνίδιος ἐν πρώτῳ γῆς περιόδου τοὺς Φοίνικας λέγει θῦειν τῶ Ἡρακλεῖ ὄρτυγας διὰ τὸ τὸν Ἡρακλέα τὸν Ἀστερίας καὶ Διὸς πορευόμενον εἰς Λιβύην ἀναιρεθῆναι μὲν ὑπὸ Τυφῶνος, Ἰολάου δ' αὐτῶ προσενέγκαντος ὄρτυγα καὶ προσαγαγόντος ὄσφρανθέντα ἀναβίοναι. ἔχαιρε γάρ, φησὶ, καὶ περὶ τῶ ζῶω τούτῳ.

Digital Athenaeus Project BY-SA

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 database 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



Figure 4.46. Named Entity disambiguation in the DFHG

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).

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.

.....ΟΥ.....ΝΡΑΝ.....ΩΝ.....ΝΩΝΑΝΕΡΡΑΥΑΤΟΥΣΑ.....
ΑΡΕΑΜ.....ΣΑΡΟΚΕΦΟΡΟΣΤΟΥΡΑΤΟΥΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΣΙΔΕΚΡΟΝΤΟΞΕΜΡΑΡΟΙ.....
ΥΑΝΑΚΤΟΣΑΗΗΝΕΙΝΔΕΔΙΟΓΝΗΤΟΥ.....ΑΡΟΥΕΠΟΥΑΗΗΝΕΣΒΑΣΙΛΕΥΣΑΗΗΚΡΑΝΕΡΡΟΙΔΕΚΑΗΘΤΡΟΤΕΡΟΝΚΑΛΟΥ
 ΜΕΝΗΑΚΤΗΗΑΡΟΚΤΑΙΟΥΤΟΥΑΥΤΟΝΟΝΟΣΕΤΗΧΗΗΔΡΗΙΑΦΟΥΔΕΥΚΑΙΝΠΑΡΑΤΟΝΡΑΝΑΣΕΝΕΝΑΥΚΕΡΡΕΙΑΕΒΑΣΙΛΕΥΣΕ...ΣΙΑΕ...
 5...ΝΤΟΣΑΗΗΝΕΚΕΡΡΟΣΕΤΗΧΗΗΔΑΦΟΥΔΙΚΗΑΗΗΝΗΕΙ...ΝΕΤΟΑΡΕΚΑΙΡΟΣΕΙΔΑΝΙΥΡΡΑΙΑΙΡΡΟΦΟΥΤΟΥΡΟΣΕΙΔΝΟΣΚΑΙΟΤΟΣΕΚΑΘΗΝΘ
 ΑΡΕΙΟΥΡΑΓΟΣΕΤΗΧΗΗΡΗΗΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡ...ΟΥΑΦΟΥΚΑΤΑΚΑΥΣΟΣΕΡΙΑΔΕΥΚΑΙΝΟΣΕΓΕΝΕΤΟΚΑΙΔΕΥΚΑΙΝΟΤΟΥΣ
 ΟΜΕΡΟΥΣΕΥΤΕΓΕΝΕΓΑΚΕΡΕΣΙΣΑΗΗΝΑΣΡΟΙ...ΟΝΚΑΙΤΟΥΔΙΟ...ΥΟΥ...Δ...ΜΤΟΥΤΡ...ΟΝΙΔ...Ο...ΤΑΣΤΗΡΙΑΕΥΣΕΝ
 ...ΤΗΧΗΗΡΑΡΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡ...Ν...ΟΥ...ΙΤΥΟΝΔΕΡΑΚΑΝΟΣΕΒΑΣΙΛΕΥΣΕΝΕΡΜΟΥΣΕΒΑΣΙΛΕΥΣΑΙΣΥΝΗΓΕ
 ...ΟΥΣΕΡΠΙΤΟΝΟΡΟΙΚΟΥΝΤΑΣΚΑΙ...ΜΑΞΕΝΑΜΦΙΚΤΥΝΑΣΑΙΡ...ΝΟΥ...ΚΑΙΝΥΝΕΤΗΟΥΣΙΝΑΜΦΙΚΤΥΝΕΣ
 10...ΤΗΧΗΗΡΗΗΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΜΦΙΚΤΥΝΟΣΑΦΟΥΕΛΛΗΝΟΔΕΥΡ...ΕΤΙΔΟΣΕΒΑΣΙΛΕΥΣΕΡΑΙΕΛΛΗΝΕΣ
 ...ΟΜΑΣΟΝΕΑΝΤΟΡΡΟΤΕΡΟΝΓΡΑΙΟΚΕΚΑΛΟΥΜΕΝΗΚΑΙΤΟΝΑΓΣΑΝΡΑΝΑ...ΝΑΙ...ΣΙΧΗΗΡΗΗΡΒΑΣΙΛΕΥΟΝΤΟΣ
 ΑΗΗΝΕΡΑΜΦΙΚΤΥΝΟΣΑΦΟΥΕΛΛΗΝΟΔΕΥΡ...ΕΤΙΔΟΣΕΒΑΣΙΛΕΥΣΕΝ...ΕΤΣΕΝΤΗΚΑΔΑΜΕΙ
 ΑΝΕΤΗΧΗΗΡΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΜΦΙΚΤΥΝΟΣΑΦΟΥ...ΝΗΚΗΣΕΒΑΣΙΛΕΥΣΑΝ
 ΕΤΗΧΗΗΡΗΗΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΜΦΙΚΤΥΝΟΣΑΦΟΥ...Η...ΝΕΕΑΙΓΥΤΟΥ
 15...ΙΣΤΗΝΕΛΛΑΔΕΡΑΕΥΣΕΚΑΙΝΟΜΑΣΟΗΡΕΝΤΗΘΝΟΤΟΥΣΑΙΜΑΔΑΝΑΟΥΟΥΓΑΤΕΡΕ...ΟΝΗΚΑΙΒΑ...
 ...ΑΡΕΥΚΑΙΕΛΗΗΗΑΡΧΕΔΙΗΗΑΡΟΜΗΡΕΣΙΖΑΠΡΟΤΣΑΝΟΥ...ΑΝΤ...
 ΚΑΙΕΥΣΑΝΕΡΠΤΗΕΚΤΗΣΕΜΡΑ...ΔΙΕΝΑΝΔΙΤΗΣΡΟΙΕΕΤΗΧΗΗΔΔΡΗΙΑΒΑΣΙΛΕΥ...
 ΘΟΝΟΣΑΡΝΑΘΗΝΑΙΟΙΣΤΟΙΣΡΡΤΟΙΣΓΕΝΟΜΕΝΟΣΑΡΜΑΕΥΣΕΡΑΙΤΟΝΑΓΣΑΝΕΔΕΙΚΝΥΕΚΑΙΘΗΝΑΙΟΥΣ...ΟΝ...ΑΙ...
 ...ΕΡΝΗΗΤΡΟΣΕΦΑΝΗΕΚΡΥΒΕΛΟΙΣΚΑΙΥΑΝΙΣΟΡΡΥΖΑΥΟΥΣΡΡΤΟΧΥΡΕΠΕΓ...ΑΝΝΑΙ...ΣΦΡ...
 20...ΘΥΜΕΝΗΝΦΥΓΙΣΤΙΠΡΑΤΟΣΗΥΛΗΣΕΚΑΙΛΑΛΟΥΝΟΜΟΥΣΗΜΗΤΡΟΣΔΙΟΝΥΣΟΥΡΑΝΟΣΚΑΙΤΟΝΕ...
 ...ΕΤΗΧΗΗΔΔΡΗΙΑΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΜΦΙΚΤΥΝΟΤΥΤΙΑΡΜΑΔΕΥΣΑΝΤΟΣΑΦΟΥΗΝΕ...ΡΡ...ΒΑ...
 Δ...ΑΟΝΙΑΝΚΙΣΕΒΑΣΙΛΕΥΟΝΤΟΣΕΥΡΕΠΕΝΤΗΙΗΔΙΕΥΡΟΝΤΕΝΕΝΑΙΣΑΝΑΚΤΥΝΟΜΕΑΜΙΟΣ...
 ...ΑΕΥΟΝΤΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥΑΗΗΗΡΑΦΙΚΟΜΕΝΗΣΑΗΗΝΑΣΚΡΟΝΕΟΥ...ΥΕΝΚΑΙΡΡ...ΡΑ...ΟΤΗΔ...
 ...ΡΗΓΤΟΛΕΜΟΥΤΟΥΕΛΕΟΥΚΑΙΝΕΑΡΣΑΕΤΗΧΗΗΔΔΡΗΙΑΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΠΙΧΕΣΕΑΦΟΥΤΡΗΠΤ...
 25...ΣΕΡΠΕΝΕΝΤΗΡΑΡΙΑΗΑΟΥΜΕΝΗΕΛΕΥΣΙΝΙΕΤΗΧ...ΔΔΔΡΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕ...
 ...Ν...ΑΥΤΟΥΡΟΗΝΕΣ...ΘΗΕΡΟΠΕΙΣΑΡΡΗΚΑΙΔΗΗΗΡΕΣΙΣΤΗΙΝΚΑΙΤΟΝΑΥΤΟΥ...
 ...ΦΟΣΤΕΝΥΤΟΣΑΜΕΝΑΝΤΟΝΚΑΡΟΝΕΤΗΧΗΗΔΔΡΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΠΙΧΕΣ...
 ...ΝΟΥΤΑΝΥΤΗΡΙΑΛΕΦΗΝΕΝΕΛΕΥΣΙΝΙΚΑΙΤΑΣΤΟΥ...ΟΥΣΑΟΥΡΟΗΣ...ΣΕΒΕΗΚ...
 ...ΔΣΤΟΥΡΑΝΔΙΟΝΟΣΑΦΟΥΚΑΡΜΟΣΡΡΤΟΤΕΓΕΝΕΤΟ...ΟΥΡΡΟΔΙΟΝ...ΕΑΝΤ...
 30...ΔΗΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΤΟΥΕΡΡΟΡΕΑΦΟΥ...ΝΕΛΕΥΣΙΝΙΟΥΤΥΜΗΚΟΣ...ΑΦΟΥ...
 ...ΑΙ...ΤΑΥΚΑΙΕΛΕΥΡΑΔΙΕΓΕΥΕΤΟΚΑ...Ε...ΑΥΑΝΟΣΕΑΗΗΝΕ...ΤΟΣΕΑ...Ε...Η...ΒΑΣΙΛΕΥΟΝ
 ΤΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΤΟΥΕΚΡΟΡΟΣΑΦΟΥ...Γ...ΗΔΗΡΑΚΗΣ...Ν...Δ...Δ...
 ΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥΑΗΗΝΕ...ΣΤΑΝΚΑΡΡΟΝΕΓΕΝΕΤΟΚΑΙΜΑΝΤΕΥΟΜΕΝΟΣ...ΑΡΗΝ...ΑΔΝΕΝ...
 ...ΣΥΡΟΣΕΝ...Α...ΑΜΜΙΝΟΣΑΙΣΙΣΕΙΤΗΧΔΔΡΗΙΑΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΙΓ...ΑΦΟΥΗΣ...
 35...ΑΗΗΝΕΡΤΑΣΔΔΕΑΡΟΕΙΣΕΙΣΤΟΥΑΥΤΟΥΝΗΙΣΕΝΑΡΓΟΡΑΓΕΙΑΝΚΑΙΤΗΝΔΗΜΟΡΡΑΤΗΑΡΡΕΣ...
 ...ΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥ...
 ...ΔΔΔΡΗΙΑΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥ...ΒΑΣΙΛΕΥΣΑΝΚΑΙΤΟΝΑΓΣΑΝ...Α...Α...Α...
 ...ΕΤΗΡΗΗΗΡΑΔΔΡΗΙΑΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥ...ΝΕΞΕΙΣΤΡΟΙΑΝΕ...ΡΑΤΕΥΣ...ΕΤΗΡΗΗΗΡΗΗΗΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗ
 ...ΕΣΩΕΣΤΡΕΚΑΙΔΕΚΑΤΟΥΤΟΥΣΑΦΟΥΤΡΟΙΑΝΕΤΗΡΗΗΗΔΔΡΗΙΑΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕ...ΔΕΔΥΤΕΡΟΥΤΟΥΣΜΗΝΟΣ...
 40...ΝΟΣΕΒΕΟΝΗΗΦΗΝΟΝΤΟΣ...ΑΦΟΥΡΕΤΗ...ΙΟΙΔΑΝΑΥΤΟ...ΙΤΣΕΟΥΟΥΤΑΡ...ΟΝ...Γ...Ε...ΟΥΚΑΜ...
 ...ΑΝΕΡΕΠΟΥΡΑΤΗΝΩΝΕΣ...Ε...Ε...Ε...Η...Η...Η...Η...ΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥ...
 ...ΝΥΡΡΕΥΡΟΣΕΚΙΣΕΝΕΤΗΡΗΗΗΗΔΔΡΗΙΑΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥ...ΕΥΣΙΣΙΣ...Γ...Α...Α...Α...Α...
 ...ΑΝΕΦΕΘΕΡΟΥΡΑΣΚΑΔΟΜΕΝΑΣΤ...ΗΚΑΤΑΓΡΟΝΟΥΡΟΚΑΘΦΝΑ...ΙΟΥΝΤΑ...Α...ΣΑΜΟΝ...ΤΑ...Ι...ΕΓΕΝΕΤΟΤ...
 ...ΔΗΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕΡΑΝΔΙΟΝΟΣΑΦΟΥ...ΥΣΑΦΟΥ...ΙΟΔΟΣΡΟΗΤΗΣ...ΕΤΗΡΗΡΑΔ...ΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝΕ...
 45...ΑΦΟΥΜΗΡΟΣΡΟΗΤΗΣΕΑΝΕΤΗΡΗΑΔΔΡΗΙΑΒΑΣΙΛΕΥΟΝΤΟΣΑΗΗΝ...ΙΟΓΗΤΟΥΑΦΟΥ...ΔΝΟΑΡΓΕΙΟΣΕΑΗΜΕΥ...ΝΕΥ...

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 Diognetes (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 Historiæ 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 text of the Parian Marble is available in the DFHG *main page*, where the inscription is represented according to

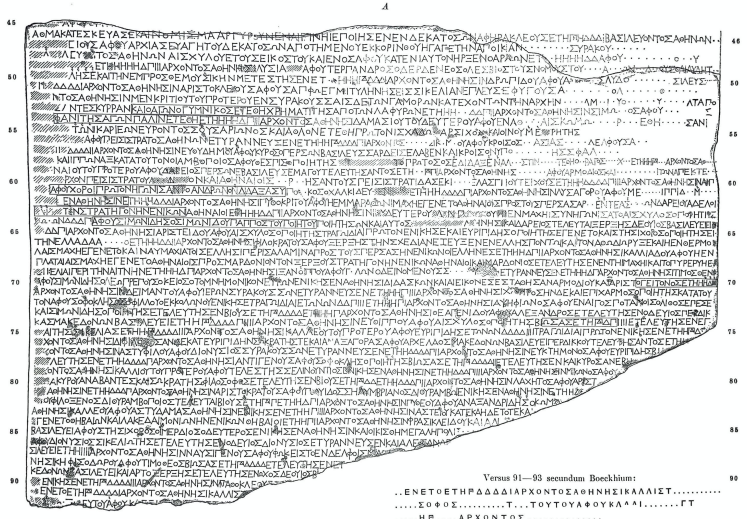


Figure 4.48. IG XII 5, 444, fr. A2

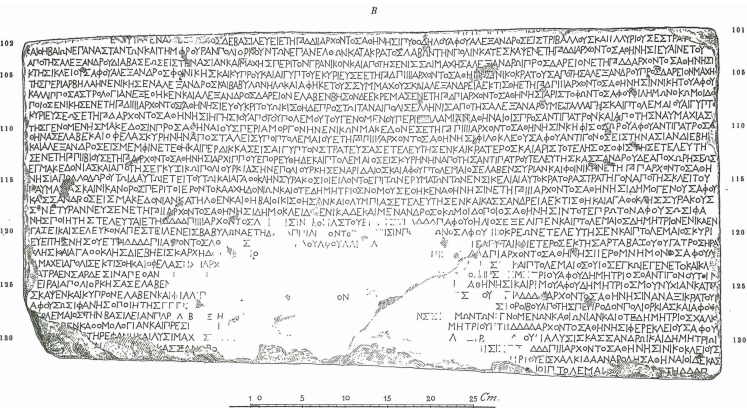



Figure 4.49. IG XII 5, 444, fr. B

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) Lysides, Dropides, Aristocles, Critias the first, Simon, Damasio the second, Ceneus, Euthydemos, Harpactides, Lysagoras, Pythocritos, Phainippides the second, Aristeides, Philocrates, Kalliades, Xanthippos, Timosthenes, Adeimantos, Chares Apsophion, Theogenides, Eurhippos, Callias the first, Diphilos, Astyphilos, Euctemon, Antigeneis, Callias the first, Mikon, Laches, Aristocrates, Pytheus, Callias, Astelos, 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, Euthyrites, Hegesios, Cephisodoros, Philocles, Archippos, Apollodoros, Demogenes, Democleides, Theophrastos, Polemon, Simonides, Hieronimemon, Demetrios, Calrimos, Anaxicrates, Corobos, Euaximippos, Pherecles, Leonstratos, 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

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.

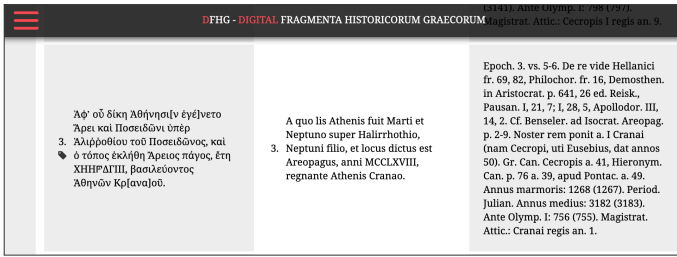


Figure 4.51. DFHG main page: *Marmor Parium*, epocha 3

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
  Ἀλιρρόθου 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 Ἀλιρρόθιου τοῦ
Ποσειδῶνος, καὶ ὁ τόπος ἐκλήθη Ἄρειος πάγος, ἔτη
XHH&#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

²⁸⁴ https://github.com/DFHG-project/volume_1/blob/master/data/epidoc_xml/MARMOR_PARIUM.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	Ϟ	50
Γ	5 = π(έντε)	ϞϞ	500
Δ	10 = δ(έκα)	ϞϞϞ	5000
H	100 = h(εκατόν)	ϞϞϞϞ	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 Ϟ H ϞϞ 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

288 More editions and publications of the Parian Marble are available at <http://www.digitalmarmorparium.org/bibliography.html>. I'm very grateful to Andrea Rotstein for her permission to encode in XML her edition of the Parian Marble. I'm also grateful to her for a meeting at the Ashmolean Museum of the University of Oxford on the occasion of a presentation of the *Digital Marmor Parium* project that I gave for the *Oxford Ancient History Seminar on Digital Classics* on March 3, 2015. The podcast of the seminar is available at <http://www.podcasts.ox.ac.uk/digital-classics-digital-marmor-parium>. As part of the integration of the DFHG project with the *Jacoby Online* (section 2.1.2), the text of the *Marmor Parium* edited by James Sickinger for BNJ 1 and currently reviewed for BNJ 2 will be soon converted into EpiDoc XML and added to the *Digital Marmor Parium* repository.

289 I'm very grateful to Gabriel Bodard, Charlotte Rouché, and Simona Stoyanova for helpful and fruitful discussions about the encoding of the Parian Marble.

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, Thraette (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	Ϟ	50	XX	2000
III	3	ΔΓΙΙΙ	18	ϞΔ	60	XXX	3000
IIII	4	ΔΓΙΙΙΙ	19	ϞΔΔ	70	XXXX	4000
Γ	5	ΔΔ	20	ϞΔΔΔ	80	Ϟ	5000
ΓΙ	6	ΔΔΙ	21	ϞΔΔΔΔ	90	ϞX	6000
ΓΙΙ	7	ΔΔΙΙ	22	H	100	ϞXX	7000
ΓΙΙΙ	8	ΔΔΙΙΙ	23	HH	200	ϞXXX	8000
ΓΙΙΙΙ	9	ΔΔΙΙΙΙ	24	HHH	300	ϞXXXX	9000
Δ	10	ΔΔΓ	25	HHHH	400	M	10,000
ΔΙ	11	ΔΔΓΙ	26	Ϟ	500	MM	20,000
ΔΙΙ	12	ΔΔΓΙΙ	27	ϞH	600	MMM	30,000
ΔΙΙΙ	13	ΔΔΓΙΙΙ	28	ϞHH	700	MMMM	40,000
ΔΙΙΙΙ	14	ΔΔΓΙΙΙΙ	29	ϞHHH	800	Ϟ	50,000
ΔΓ	15	ΔΔΔ	30	ϞHHHH	900	<i>etc.</i>	

year 1268, which means that the event occurred 1268 years before 264/63 BC.²⁹²

MP A1, 3: Ἄφ' οὗ δίκη Ἀθήνησι [ἐγέ]νετο Ἄρει καὶ Ποσειδῶνι ὑπὲρ Ἀλιρρόθιου τοῦ Ποσειδῶνος, καὶ ὁ τόπος ἐκλήθη Ἄρειος πάγος, ἔτη ΧΗΗϞΔΓΙΙΙ, 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">Ἄφ' οὗ δίκη
  Ἀθήνησι <supplied reason="lost">ἐγέ</supplied>νετο Ἄρει καὶ
  Ποσειδῶνι ὑπὲρ Ἀλιρρόθιου 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

292 The text is from the edition of Rotstein (2016) 38: "From the time a trial occurred 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>:

```

1 <calendarDesc>
2   <calendar xml:id="marmor_parium">
3     <p>Marmor Parium year, elapsing from 264/63 BC</p>
4   </calendar>
5   <calendar xml:id="attic">
6     <p>Attic calendar</p>
7   </calendar>
8 </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 Ἀθηναίους
 πρὸς τοὺς Πέρσας Ἀρ[ταφ]έ[ρην] τε τὸν Δαρείου ἀδελφι[δοῦν κα]ἰ
 [Δᾶ]«τ[ι] στρατηγόν, ἦν ἐνίκων» Ἀθηναῖοι, ἔτη ΗΗΔΔΠΠ, ἄρχοντας
 Ἀθήνησιν τ[ο]ῦ δευτέρου [Φ]α[ι]ν[ι]π[τίδ]ου· ἦι ἐν μάχῃ συνηγωνί-
 σατο Αἰσχύλος ὁ ποιητής, ἐτῶν ὦν ΔΔΔΠ.

294 The text is from the edition of Rotstein (2016) 44: "From the time the battle in Marathon occurred, 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' οὐ ἡ ἐμ Μαραθῶνι μάχη ἐγένετο Ἀθηναίοις
πρὸς τοὺς Πέρσας Ἄρ<supplied reason="lost">ταφ</supplied>ε̅<
supplied reason="lost">ρηνη τε τὸ</supplied>ν Δαρείου ἀδελφι<lb n=
"63"/><supplied reason="lost">δοῦν κα</supplied>ἰ <supplied reason
="lost">Δᾶ</supplied><add place="overstrike">τ<supplied reason="
lost">ι</supplied>ν στρατηγόν, ἦν ἐνίκων</add> Ἀθηναῖοι, ἔτη <date
from="-0490" to="-0489" when-custom="227" datingMethod="#
marmor_parium"><num type="acrophonic">ΗΗΔΔ&#x10143II;</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>ν<supplied
reason="lost">πίδ</supplied>ου· ἦι ἐν μάχῃ συνηγωνίσαστο Αἰσχύλος
ὁ ποιητής, <lb n="64"/> ἐτῶν ὦν <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 (ΗΗΔΔΓII = 227) and the age of Aeschylus (ΔΔΔΓI = 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* (ΓI) and the *Greek Acrophonic Attic Fifty* (FI) 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 Supplementary 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:

ΓI	<i>Greek Acrophonic Attic Five</i>	𐅃
FI	<i>Greek Acrophonic Attic Fifty</i>	𐅄
FI	<i>Greek Acrophonic Attic Five Hundred</i>	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

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 L^AT_EX: 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* (𐀀), which is therefore substituted by a placeholder that shows the corresponding Unicode code.

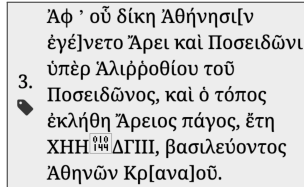


Figure 4.52. DFHG main page: first version with default font

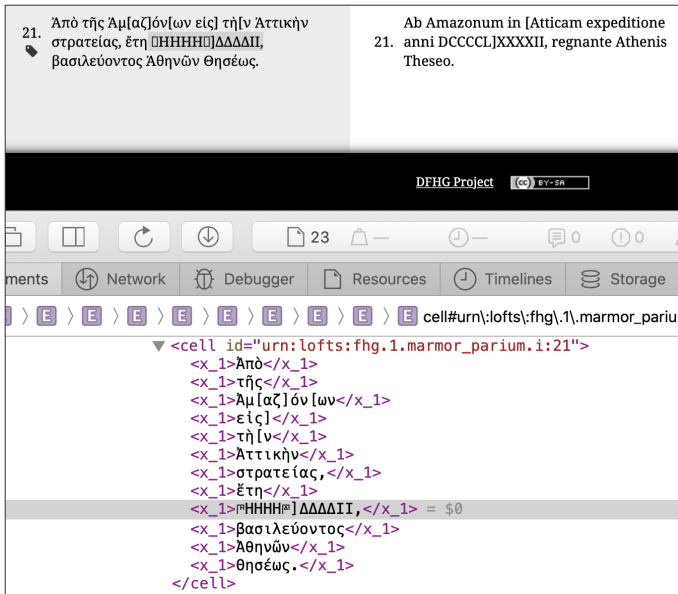


Figure 4.53. DFHG main page: Safari web browser version 13.0.4 (15608.4.9.1.3)

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* (𐀀) 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* (𐀅) and the *Greek Acrophonic Attic Fifty* (𐀆) 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 ὦν ἀπὸ Τημένου ἐκ Κορίνθου ἤγαγε τὴν ἀποικίαν [καὶ ἔκτισε] Συρακούσας, 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>Αρχίας</name> <persName>
<name>Εὐαγήτου</name></persName></persName> δέκατος ὦν ἀπὸ <
persName><name>Τημένου</name></persName> ἐκ <placeName>Κορίνθου</
placeName> ἤγαγε τὴν ἀποικίαν <supplied reason="lost">καὶ ἔκτισε</
supplied> <placeName>Συρακού<supplied reason="lost">σας</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">βασί</supplied>λέυ<
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

299 The exception is the name of the archon of Paros, which is partly lost ([ὐνάνακτος) 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>λεú<supplied reason="lost">ον</supplied>τος Ἀθηνῶν <persName><name>Αἰσχύλου</name></persName>, <date type="office-span" dur="P21Y">ἔτους εἰκοστού 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 [ἔξ] Ἀσίας [εἰς] Δελφοῦς ἀ[- - ἔτη
 Η]Η[ῤ]ΔΔΔΔΠ, ἄρχωντος 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&#x10144ΔΔΔΔΠ;</num>,
  ἄρχωντος <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&#x10144ΔΔΔΔΠ;<
  /num></date>,
4 <date from="-0556" to="-0555" when-custom="292"
5 datingMethod="#"marmor_parium">ἄρχωντος <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 ἦλω, ἔτη ϠΗΗΗΗΔΔΔΔΓ, βασιλεύοντος Ἀθηνῶν [Μενεσθέ]ως δευτέρου <καὶ εἰκοστοῦ> ἔτους μηνὸς Θ[αργηλιῶ]νος ἐβδόμηι 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> ἦλω, ἔτη <
  date from="-1208" to="-1207" when-custom="945" datingMethod="#
  marmor_parium"><num type="acrophonic">&#x10145ΗΗΗΗΔΔΔΔ;&#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">
  ἐβδόμηι</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 Περωσῶν 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 ϠΔΓ»ΙΙΙ, ἐτε-
λεύτησεν ἐγ [Γέ]λαι τῆς Σικελίας, ἔτη ΗϠΔΔΔΔΙΙΙ, ἄρχοντος Ἀθή-
νησι 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 [Meneste]lus 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 Calles the elder was archon in Athens."

```

1 <seg type="entry" n="59">ἄφ' οὐ 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 ἐν <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">Η&#x10144ΔΔΔIIII;</num></date>, ἀρχοντος 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 Παρνασσόν: MP A1, 2), tribunals (e.g., Ἀρείωι Πάγωι: MP A1, 25), ethnics (e.g., ὁ Φρόξ: 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 inscription.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.packhum.org/text/77668>. On this collection, see p. 69.

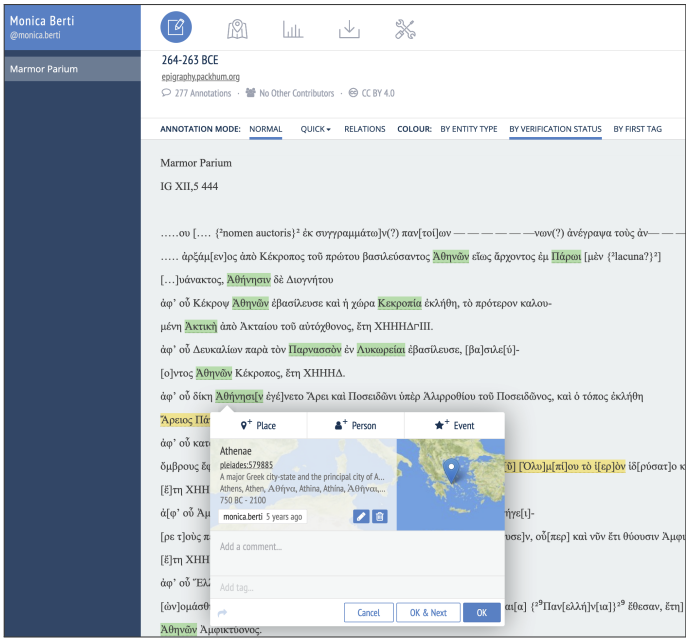


Figure 4.54. Recogito: document view with annotations of the *Marmor Parium*

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/uynxk84uyyiczck>. 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 Διὸς τ]ο[ῦ] [Ὀλω]μ[πί]ου τὸ ἰ[ε]ρὸν, Ἄρειος Πάγος, Καδμεΐ-αν, Ἄρει[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*

Ἄθηνῶν	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](http://pleiades.stoa.org/places/579885)), πόλις ἑλληνίς ([pleiades:59672](http://pleiades.stoa.org/places/59672)), and νήσου ([pleiades:707498](http://pleiades.stoa.org/places/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*

[Αθή]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
[Αθήνη]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[σας]	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
Δελφοῖς]	1	http://pleiades.stoa.org/places/540726
Δελφούς	1	http://pleiades.stoa.org/places/540726
Δελφοῖς	2	http://pleiades.stoa.org/places/540726
Πυθία]ς	1	http://pleiades.stoa.org/places/540726
Αἴγυπτου	2	http://pleiades.stoa.org/places/766
Αἴγυπτον	1	http://pleiades.stoa.org/places/766
Αἴγυπτο[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*

Σικελίαν	1	http://pleiades.stoa.org/places/462492
Σικελίας	1	http://pleiades.stoa.org/places/462492
[Σ]ι[κ]ελίαι	1	http://pleiades.stoa.org/places/462492
Ἐλευσίη	2	http://pleiades.stoa.org/places/579920
Ἐραρίαι καλουμένηη Ἐλευσίη	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
Θερμοπόλαις	1	http://pleiades.stoa.org/places/541140
Σάρδεις	1	http://pleiades.stoa.org/places/550867
Σάρδεσιν	1	http://pleiades.stoa.org/places/550867
Καρχηδόνα	1	http://pleiades.stoa.org/places/314921
Καρχηδόνα	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
Βαβυλῶν	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
Ἀΐτην	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[ώ]τιδος	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
Ἑλλησπόντου	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
Ἰδηι	1	http://pleiades.stoa.org/places/589816
Λ[υ]-[σι]μάχεια	1	http://pleiades.stoa.org/places/501458
Χαλκί[-]δα	1	http://sws.geonames.org/260133
Ἐφεσον	1	http://pleiades.stoa.org/places/599612
Ἐρυθρὰς	1	http://pleiades.stoa.org/places/550535
Κλαζομενάς	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 πόλις	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[ε]λ[α]τ[ι]ναί[ς]	1	http://pleiades.stoa.org/places/638751
[Κ]ρήτης	1	http://pleiades.stoa.org/places/589748
Κυδωνία	1	http://pleiades.stoa.org/places/589886
Ἀρχαδίαι	1	http://pleiades.stoa.org/places/570102
[Γέ]-[λα]	1	http://pleiades.stoa.org/places/462214
Ἡλιδ[ι]	1	http://pleiades.stoa.org/places/570220
Σαλαμίνα	1	http://pleiades.stoa.org/places/707617
[Πορ]ί[ν]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[ε]λασγ[ι]κ[οῦ] τείχους	1	http://dare.ht.lu.se/places/25113

Table 4.3 *continued*

Ἄθω	1	http://pleiades.stoa.org/places/501365
Σαλαμίνα	1	http://pleiades.stoa.org/places/580101
Κολωνοῦ	1	http://pleiades.stoa.org/places/582869
Κυζίκωι	1	http://pleiades.stoa.org/places/511218
Μουνησίαν	1	http://pleiades.stoa.org/places/580029
Λίνδωι	1	http://pleiades.stoa.org/places/589913
Φρυγίας	1	http://pleiades.stoa.org/places/609502
[Μ]υοῦντα	1	http://pleiades.stoa.org/places/599813
Χίον	1	http://pleiades.stoa.org/places/550497
Αιγίνηι	1	http://pleiades.stoa.org/places/579844
Κύρραν	1	http://pleiades.stoa.org/places/540868
Λεύκτροις	1	http://pleiades.stoa.org/places/540913
Γράνικον	1	http://pleiades.stoa.org/places/511260
Ἴσσωι	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)

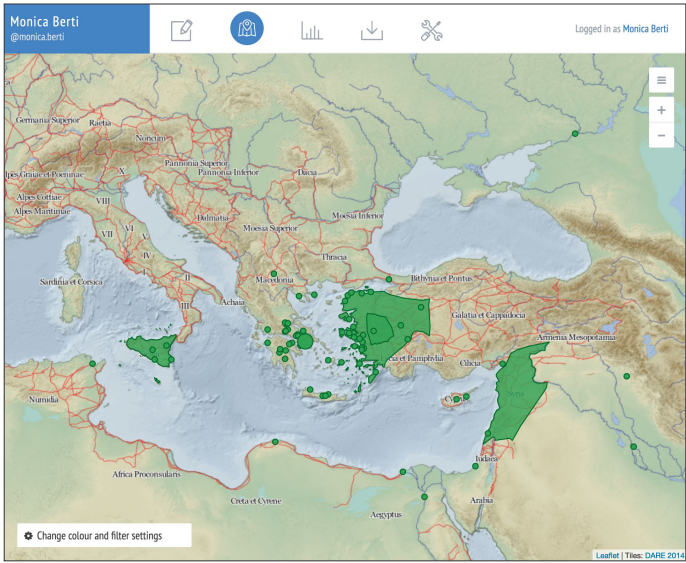


Figure 4.56. Recogito: map view of the *Marmor Parium* (Ancient Places map)

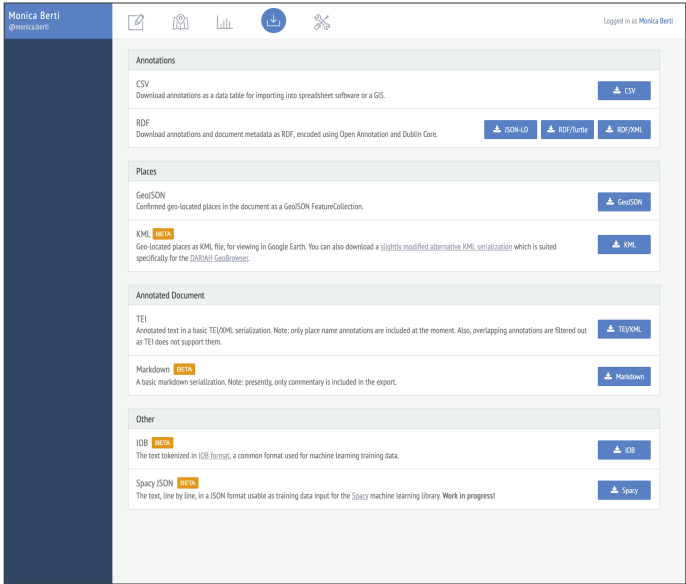


Figure 4.57. Recogito: download options for the *Marmor Parium*

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 *OpenStreetMap*); 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

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 and 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-

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

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.

Marmor Parium Lines	Event	Marmor Parium Year (IG XII 5, 444)	Year (Gregorian calendar) [IG XII 5, 444]	Attalid king	Attalid archon	Other names
1	Founding of the Kingdom of Pergon	-	188/180-204/3	Demetrius		
2	Death of Antiochus III	-	188/180	Demetrius		
3	Death of Antiochus III	1310	187/72	Demetrius		
4	Death of Antiochus III	1310	187/72	Demetrius		
5	Death of Antiochus III	1268	183/130	Craneas		
6	Death of Antiochus III	1268	183/130	Craneas		
7	Death of Antiochus III	1268	183/130	Craneas		
8	Death of Antiochus III	1268	183/130	Craneas		
9	Death of Antiochus III	1268	183/130	Craneas		
10	Death of Antiochus III	1268	183/130	Craneas		
11	Death of Antiochus III	1268	183/130	Craneas		
12	Death of Antiochus III	1268	183/130	Craneas		
13	Death of Antiochus III	1268	183/130	Craneas		
14	Death of Antiochus III	1268	183/130	Craneas		
15	Death of Antiochus III	1268	183/130	Craneas		
16	Death of Antiochus III	1268	183/130	Craneas		
17	Death of Antiochus III	1268	183/130	Craneas		
18	Death of Antiochus III	1268	183/130	Craneas		
19	Death of Antiochus III	1268	183/130	Craneas		
20	Death of Antiochus III	1268	183/130	Craneas		
21	Death of Antiochus III	1268	183/130	Craneas		
22	Death of Antiochus III	1268	183/130	Craneas		
23	Death of Antiochus III	1268	183/130	Craneas		
24	Death of Antiochus III	1268	183/130	Craneas		
25	Death of Antiochus III	1268	183/130	Craneas		

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

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.

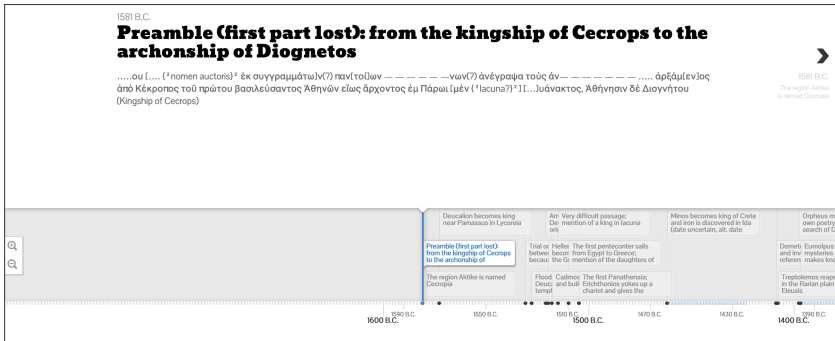


Figure 4.59. Digital Marmor Parium: TimelineJS

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

326 Celano (2019). Annotations are available at <http://www.digitalmarmorparium.org/linguistics.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/Sommerschild et al. (2019) and <https://github.com/sommerschild/ancient-text-restoration>.

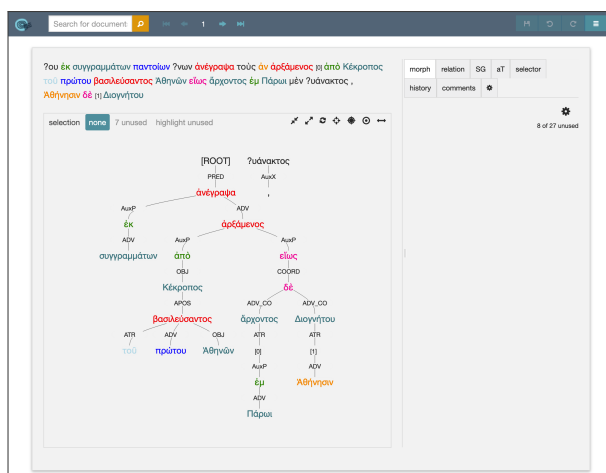


Figure 4.60. Digital Marmor Parium: linguistic annotation with *Arethusa*

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 drawings 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 Museum, Oxford); Fragment A (2) (courtesy of the Ashmolean Museum, Oxford); Fragment A (*Wikimedia*)
- Fragment B: Fragment B (*Wikimedia*)

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 Ashmolean 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).

331 I'm very grateful to Yannis Kourayos, Director of the Archaeological Museum 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 Leipzig 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 activities of the courses in Digital Humanities, Digital Philology,

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 Griechisch) 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 die Rosettana?

Der Stein von Rosette ist ein Synodalekret 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 Griechisch (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-Raschid 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, Portrait v. Léon Cogniet (© Joconde database: entry:000F0000322).




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 Ahen Ehren zuteil (Statue, Kult, Feste) und den Priestern ein neuer Titel verliehen.

Was ist textual Alignment?

Vorarbeiten: Der griechische Text der Rosettana ist im Rahmen der *Leipzig Open Fragmentary Texts Series* (LOFITS) übersetzt und annotiert worden. Für den hieroglyphischen Teil wurde ein Test-Alignment mit dem Tool *Alpheios* (<https://alpheios.net/>) erstellt.

Das Alignment stellt eine Wortverknüpfung dar, die den Erwerb einer Sprache und den Sprachvergleich digital unterstützt. Im Projekt ist dafür die von **Tariq Yousef** entwickelte Software *Ugarit Aligner* (<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 Mausclick 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.

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 von §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. Teilweise ist dies mit dem griechischen Text im Tool *Arehusa* (<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.

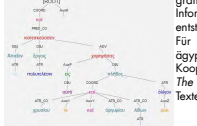


Abb. 4: Satzstruktur des griech. Texts, Zeile 33.34.




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)

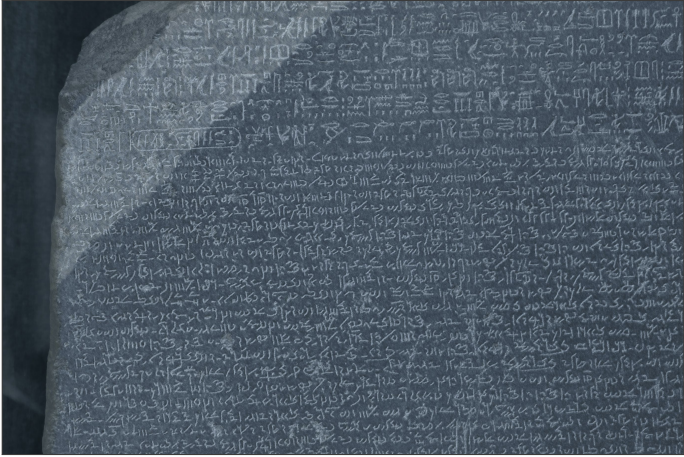


Figure 4.65. Rosetta Stone: left upper part (photo: A. Barmpoutis)

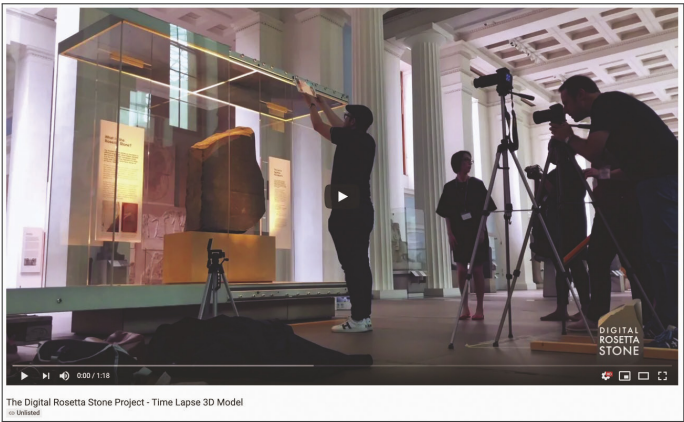


Figure 4.66. London, British Museum: time-lapse 3D model of the Rosetta Stone

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 (fig. 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.

337 The Hieroglyphic and Demotic versions are re-presented 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).