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Thematic issue:

Digital Classics and Ancient History

***Issue Editor: Rada Varga, Center for Roman Studies,
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BOOK REVIEW

Digital Classics Outside the Echo-Chamber: Teaching, Knowledge Exchange &
Public Engagement, Gabriel Bodard and Matteo Romanello, editors,
London: Ubiquity Press, 2016. ISBN (Paperback) 978-1-909188-48-8
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Thematic issue

Digital Classics and Ancient History

Coordinators Foreword

The forth issue of *Studia Universitatis Babeş-Bolyai Digitalia* focuses on digital classics and ancient history. The initiative was rooted in the Digital Ancient History and Archaeology workshop hosted by the Babeş-Bolyai University in June 2018. Some of the papers published herewith were presented there, while others are later additions, which we believed best-fitted to the thematic of the volume in order to help us render a more thorough image of what *studia digitalia* in these fields mean today.

The published articles illustrate the diversity of what digital ancient history (with classics and archaeology included) represents and the variety of research branches that have developed during the last decade. The first study is representative for digital classics, P. Soldo and P. Šoštarić presenting the process of treebanking Lucian's work in Arethusa. Their endeavor has an important didactic component as well, as the treebanking was undertaken over one semester at a BA level course on Greek syntax, at the University of Zagreb. Remaining in the realm of written sources, but moving from literature to epigraphy, S. Gazzoli presents a 'work-in-progress', namely a relational database for inscriptions, being created as part of a project dealing with infant mortality in northern Italy. Dealing with Roman inscriptions as well, but focused on prosopographic data, is Romans 1by1, the database documented through the article of R. Varga, A. Pázsint and A. Lumezeanu. The next article, signed by V. Popovici and R. Varga, keeps us in the realm of historical prosopography, as the published investigation showcases examples from completely different historical periods, which point out the relevance of employing digital tools in historical researches. The last article, signed by a working group led by A. Timofan and C. Şuteu, is a project presentation dealing with the digitization of the archaeological heritage of the Museum of Alba Iulia. Their work is concentrated on 3D scanning and printing statues of divinities, to the benefit of scientists and the public alike.

As one can see, the problems dealt with in the current issue are very diverse in nature and so are the applied and described methodologies. The motivations of the authors are also multi-folded, ranging from building efficient didactic means, to building efficient research tools and from gaining historic knowledge by employing new techniques, to popularizing and preserving in digital format a given archaeological heritage. This great variety speaks for itself about the fruitfulness brought into the research, teaching and outreach of the ancient world by the employment of digital tools and methods.

As digital humanities are still sometimes regarded as the outsider – or at least the late-comer – of Humanities in general, our main stake is to highlight and underline their utility for the advancement of knowledge. Besides their obvious employment in the fields of teaching and 'speaking' for wider audiences, *digitalia* help us gain knowledge and uncover historical facts otherwise hidden – speaking of historical disciplines in particular. Because we live in a digital age, we must take advantage of its means, as scientists and as teachers. Thus, presenting and publishing convincing results of researches which imply digital components means encouraging the development of digital humanities and presenting them to the academic community as a worthwhile, necessary branch of our environment.

Rada VARGA

Editor

Treebanking Lucian in Arethusa: experiences, problems and considerations

Petar Soldo, Petra Šoštarić

University of Zagreb

Abstract: The article discusses some problems that arose while implementing two sets of annotation rules for treebanking Ancient Greek (the first set by Bamman and Crane, the second by Celano). Educational uses of treebanking are discussed, together with the most common problems that occurred while treebanking the *Iudicium vocalium* by 2nd-century writer Lucian of Samosata.

Keywords: treebanking, ancient Greek, Lucian

1. Introduction

The aim of this paper is to describe the use of treebanking in Arethusa over a one semester BA level course on Greek syntax and to discuss several problems that occurred frequently during the course. The aim of this paper is not to identify every possible problem that might occur, but to show how applying the sets of rules put forward by Bamman and Crane in 2008 and Celano in 2018 worked in practice in a specific case.

2. Treebanking classical languages

Treebanking is a form of syntactical analysis producing tree-like structures showing the dependency of parts of speech in a sentence on one another, starting from the predicate of the main clause. Apart from being used in linguistic research, treebanking has a notable pedagogical application. In a rapidly increasing world of learning tools, aids and resources, treebanking is a unique way of acquiring and exercising

language skills, and it can be especially useful when it comes to historical languages. A set of rules for treebanking Ancient Greek was put forth in 2008 by David Bamman and Gregory Crane, the *Guidelines for the Syntactic Annotation of the Ancient Greek Dependency Treebank (1.1)* (Bamman, Crane). Giuseppe A. Celano continued their work and his expanded and more detailed set of rules including a semantic layer is available online, with the latest update on March 19th 2018 (Celano). The digital tool used for treebanking is called Arethusa. It has been developed for treebanking classical languages and is freely available at the Perseids platform (Perseids).

A collection of treebanked texts, *The Ancient Greek and Latin Dependency Treebank*, is also available online (Celano, Crane, Almas & al.). It first appeared in 2006 as a Perseus/Tufts University project; later it became a joint effort of Tufts University and Leipzig University, and is currently supervised by Giuseppe G. A. Celano at the Institute of Computer Science, Natural Language Processing, Leipzig University (Celano, Crane, Almas & al., Abteilung Automatische Sprachverarbeitung). The concept of treebanking belongs to the field of Dependency Grammar. The work of Lucien Tesnière marks the beginning of Dependency Grammar in its modern form, although some concepts can be recognized in the work of pre-modern grammarians (Nivre). Several dependency treebanks have been established over the years, with the Prague Dependency Treebank especially influencing the treebanking of Latin (Bamman, Passarotti, Busa & al.) and Greek (Bamman, Crane).

3. Work process

This paper is a direct result of work done during the course titled “Greek Syntactic Period in Classical and Post-Classical Times” in the winter semester of the academic year 2018/2019 at the Department of Classical Philology at the University of Zagreb, Croatia. There were three fourth-year BA students enrolled in the course, one of whom co-authored this paper. The chosen reading for the course was Lucian’s *Iudicium vocalium (Lis consonantium)* comprising 54 sentences (more in section 4). The four teaching hours per week were divided into two hours of translation seminar and two hours of treebanking, i.e. analysing the treebanked sentences submitted by the students via the Perseids platform to the Perseids group “Zagreb Lucian 2018”. The group was established specifically for the course in question and has two board members supervising the students’ work, Neven Jovanović and Petra Šoštarić. In the beginning of the course the annotation scheme by Bamman and Crane was used, but as the course progressed, the more detailed scheme by Celano was adopted. The process

of treebanking a sentence starts with identifying the predicate and then determining the dependency of other words in the sentence to the predicate and, if they are not directly dependent on the predicate, identifying the dependency on another word. The examples 1-5 show that the article is usually dependent on the noun it refers to; in example 2 we see a case of coordination (two parts of speech at the same level of dependency); examples 2-4 illustrate the use of prepositions as bridges between the verb and the adverb. Every word in a sentence has to be appropriately labelled (OBJ for object etc.).

All 54 sentences from Lucian's *Iudicium vocalium* were submitted and discussed, either in the course of the lectures and seminars, or via the Perseids comments section. During these discussions certain problems in applying the annotation scheme arose more frequently than others. The most common problems and suggestions on how to deal with them are presented in section 5.

4. The text

The 2nd century author Lucian is somewhat of an enigma. Information on his life is scarce: born around AD 120 in Samosata, a prosperous city on the river Euphrates, most likely he was a native speaker of Aramaic; he travelled extensively throughout the Roman Empire and earned his living by teaching rhetoric and perhaps practicing law (Bricko's introduction to Lukijan, 14-18).¹ Information on his life is sometimes culled from his work, but Richter warns against taking Lucian's "speaking personae" as a realistic representation of the author himself (Richter 327-328). Lucian left behind a substantial body of work comprising around eighty titles, but his contemporaries seem to have been reluctant in discussing his *opus* (Bricko's introduction to Lukijan, 14-16, Richter 327). Bricko cites Strohmaier's suggestion that Lucian's tendency to mock his contemporaries made them unwilling to write about him (Bricko's introduction to Lukijan, 16). Nevertheless, he later influenced the likes of Alberti, Erasmus, Thomas More, Jonathan Swift and Voltaire (Costa's introduction to Lucian, *Selected Dialogues*, xiii-xiv).

The exact number of Lucian's works is disputed, and so are their dates (Bricko's introduction to Lukijan, 19). Bricko deems the *True Histories* "his best known and most read text" (Bricko's introduction to Lukijan, 29); together with his *Icaromenippus*, they

¹ For basic information in English see Costa's introduction to Lucian (*Selected Dialogues*) or J. Roberts s. v. "Lucian"; a more detailed discussion can be found in Richter.

are considered a piece of science-fiction *avant la lettre* (A. Roberts 31). Another popular work is the *Dream*, usually considered Lucian's autobiography, although Richter suggests the autobiographical presentation should not be taken at face value (Richter 334-336). The text relevant for this paper, *Δίκη φωνηέντων* or *Iudicium vocalium*, also known as *Lis consonantium*, is a judicial oration by the consonant Sigma which is accusing his fellow consonant Tau of usurping many words originally belonging to Sigma (i.e. pronounced with an /s/, not a /t/). The indignant Sigma also lists the instances of Tau's violent behaviour against other consonants, and even his malicious intrusions into the human world. The oration is addressed to a jury of vowels, hence the title. It remains to be seen to what extent this text might represent Lucian's reaction to hyper-Atticist language practice and a comment on the phonological changes that have been taking place since Hellenistic times.

The version of the text used for the purposes of the "Greek Syntactic Period in Classical and Post-Classical Times" course and consequently this paper is the one available at the Perseus Digital Library (Crane). An English translation is to be found in the relevant section of Lucian (*Works*).

5. Problems identified

It takes some time to adjust to the change from traditional grammar to the treebanking annotation schemes by Bamman and Crane and Celano (more on this in section 6), but even after a certain period of adjustment a few problems still persist. Typically, they belong to those areas of grammar already known not to be completely straightforward.

5.1. Labelling verbal complements: OBJ or ADV?

In Celano's scheme, "The OBJ ('object') label is attached to any dependent which is taken to be an argument of the verb, adjective, or adverb (excluding, of course, arguments which are captured by other labels, such as SBJ)" (Celano). Probably the most frequent discussion held during the course was when to assign the OBJ label, and when the ADV label to a verb complement. In Celano's own words, "The concept of argument is notoriously difficult to define" (Celano). Celano states that "verbs of motion take an argument expressing direction," and suggests consulting Verbnet, a lexicon of English verbs, in case of other classes of verbs (Celano). We would hereby

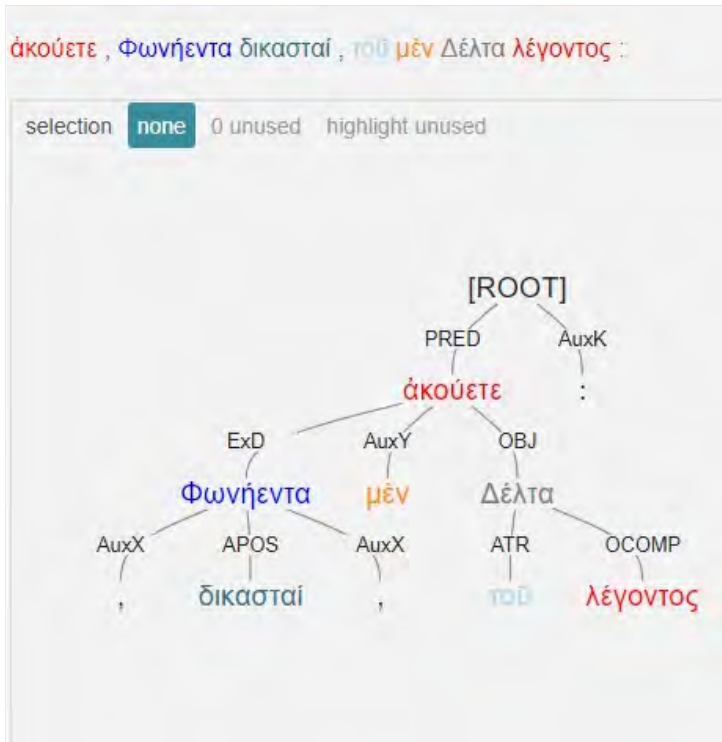
like to suggest additional classes of verbs requiring OBJ complements. These classes of verbs can be found in Smyth's *Greek Grammar* (Smyth).² Traditional case syntax is helpful in this regard since it identifies classes of verbs that typically have an argument in a certain case.

In paragraphs 1343-1411 Smyth lists the following classes of verbs taking a genitive complement: "verbs of sharing" (Smyth 320; par. 1343), "verbs signifying to *touch, take hold of, make trial of*" (Smyth 321; par. 1345), "verbs of beginning" (Smyth 321; par. 1348), "verbs signifying to *aim at, strive after, desire*" (Smyth 321; par. 1349), "verbs signifying to *reach, obtain*" (Smyth 321; par. 1350), "verbs of approaching and meeting" (Smyth 322; par. 1353), "verbs of smelling" (Smyth 322; par. 1354), "verbs signifying to *remember, remind, forget, care for and neglect*" (Smyth 322; par. 1356), "verbs signifying to *hear and perceive*" (Smyth 323; par. 1361) ([example 1](#)), "verbs signifying to *fill, to be full of*" (Smyth 324; par. 1369), "verbs signifying to *rule, command, lead*" (Smyth 324; par. 1370). Further types of genitive we consider requiring an OBJ labels are the "genitive of price and value" (Smyth 325; par. 1372-4), "genitive of crime and accountability" (Smyth 325; par. 1375-9), "genitive of connection... with verbs of saying and thinking" (Smyth 326; par. 1380) and the types of ablatival genitive: "genitive of separation with verbs signifying to *cease, release, remove, restrain, give up, fail, be distant from*" (Smyth 328; par. 1392) ([example 2](#)), "*to want, lack, empty*" (Smyth 329; par. 1396). Finally, there are the "genitive of distinction and of comparison" (Smyth 330; par. 1401-4), "genitive of cause" (Smyth 330; par. 1405) and "genitive of source" (Smyth 331; par. 1410-1).

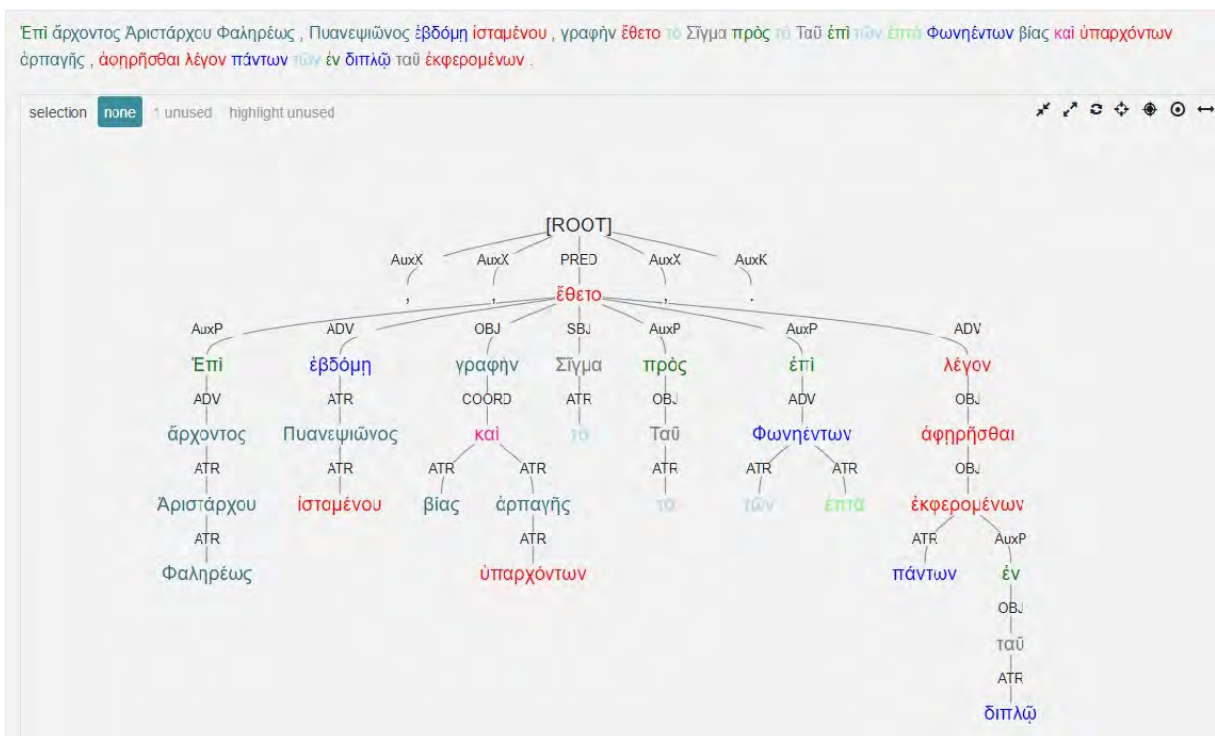
Things are much clearer with the dative and accusative since they are traditionally interpreted as indirect and direct object respectively. Still, classes of verbs requiring an OBJ are those complemented by the "dative of association" (Smyth 349; par. 1523) and "dative of accompaniment" (Smyth 349; par. 1524).

² Grammatical concepts and nomenclature are understood as in Smyth's grammar which is the standard English-language Greek grammar and also used by Celano.

Example 1: Genitive as OBJ with verbs of hearing



Example 2: Genitive of separation as OBJ



When in doubt, it is useful to consult the dictionary entry and consider the following: is there a typical complement of the verb in question? Are there different meanings listed, and do they require different complements? If the answer to one or both of these questions is yes, it is worth considering the OBJ label. Additionally, a search of the *corpus* can be performed.

In case of adjectives, it is once again helpful to follow Smyth. In the first paragraph on genitive with adjectives he states that the adjectives requiring a genitive complement are “corresponding in derivation or meaning to verbs taking the genitive” (Smyth 332; par. 1414). The types of adjectives with genitive complements requiring an OBJ label are, in Smyth’s nomenclature, the following: those expressing “possession and belonging” (Smyth 332; par. 1297), “sharing” (Smyth 332; par. 1415), “touching, desiring, attaining, tasting” (Smyth 332; par. 1416), “connection” (Smyth 332; par. 1417), “capacity and fitness” (Smyth 332; par. 1418), “experience” (Smyth 332; par. 1419), “remembering, caring for” (Smyth 333; par. 1420), “perception” (Smyth 333; par. 1421), “fullness” (Smyth 333; par. 1422), “ruling” (Smyth 333; par. 1423), “value” (Smyth 333; par. 1424) (example 3), “accountability” (Smyth 333; par. 1425), “place” (Smyth 333; par. 1426), “separation” (Smyth 333; par. 1427), “want” (Smyth 334; par. 1429), “distinction” (Smyth 334; par. 1430), “comparison” (Smyth 334; par. 1431) and “cause” (Smyth 334; par. 1405).

Example 3: adjective as OBJ



Verbal adjectives ending in -τος/τεος were another problematic point. We concluded they should have an OBJ complement in the dative case attached to them, not to the verb *to be* to which these adjectives are connected, because the adjectives bear the passive meaning which requires the *dativus auctoris*. We came to this conclusion following Bamman and Crane who state that “actors in passive constructions should be annotated as objects” and provide a genitive example (Bamman and Crane 13-14).

5.2. Particles

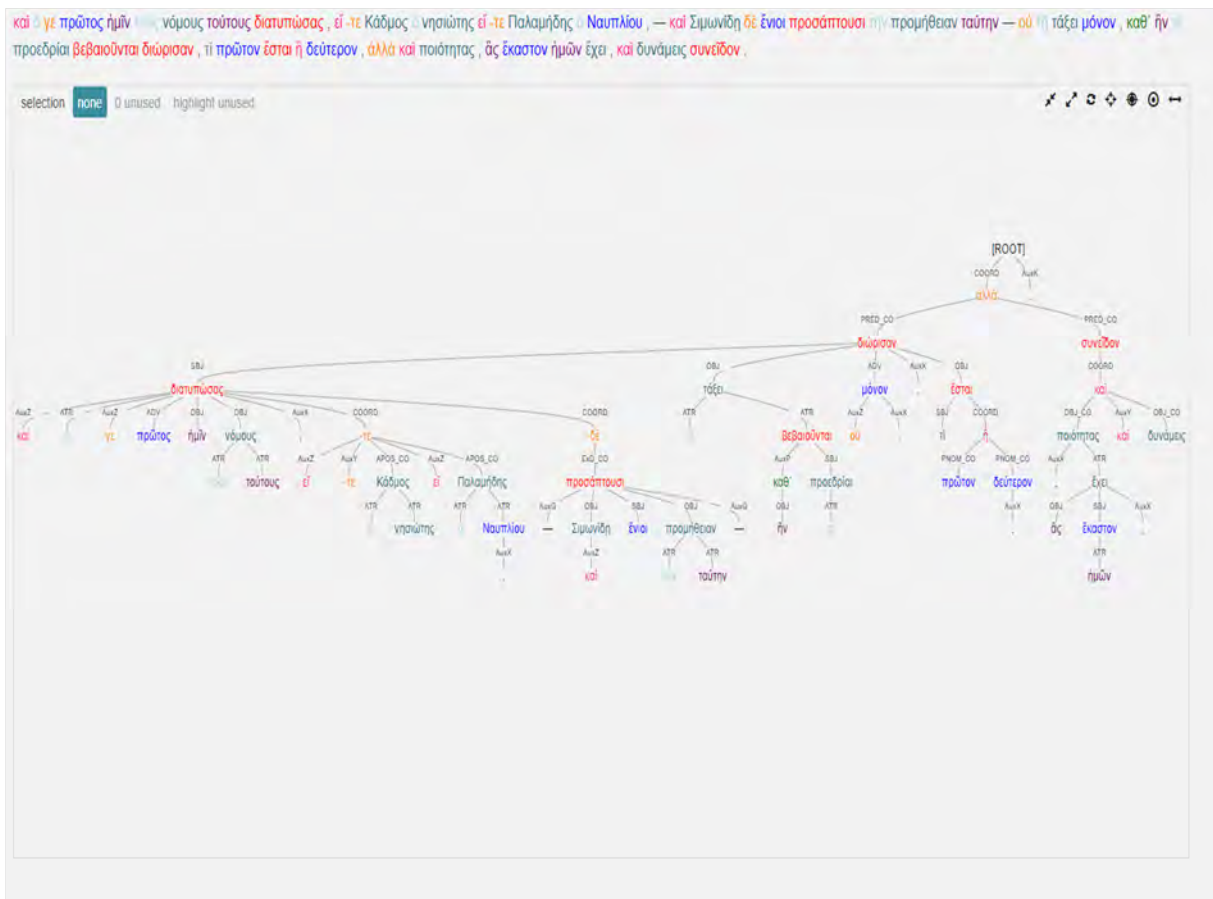
In the annotation schemes by Bamman and Crane and Celano particles can be labelled as COORD, AuxY and AuxZ. In Celano’s annotation scheme, “The function COORD (‘coordination’) is reserved for coordinate conjunctions (the list can be found in SG 2163, excluding the inferential, causal, and some of the adversative conjunctions (such as *μέντοι*); these are all treated here as (sentence) adverbs)...” (Celano). The adversative conjunctions taking the COORD function are *ἀλλά, ἀτάρ, δέ, καίτοι* (Celano). The particle *δέ* was designated as a COORD already in Bamman and Crane (25, 38). Celano discusses particles in more detail: “As is known, the meaning and function of AG particles is very complex to capture. In the following guidelines there is no attempt to provide detailed criteria to annotate particles. The annotator is only required to be able to identify those particles (in the traditional large definition of terms) which are conjunctions, such as: *ἀλλά, ἀτάρ, δέ, εἴτε, ἦ, ἡδέ, καί, καίτοι, οὐδέ, οὔτε, μηδέ, μήτε, τε*. ... Any other particle which is not one of the above conjunctions is attached to the verb of the main clause and receives the AuxY label, if the particle is a sentence adverb, or is attached to the word which it modifies and receives the label AuxZ. In the current version of the treebank it is left to the annotator to decide which of these two options is the right one for each of the non-conjunction particles” (Celano).

The particles listed by Smyth (Smyth 631-671; par. 2769-3003) that are not allowed the COORD function can therefore take both the AuxY and AuxZ label, although, in our experience, usually one more often than the other: *ἄρα* and *μέν* tend to be sentence adverbs (AuxY) more often than AuxZ, but Smyth’s grammar allows the latter, albeit in more restricted circumstances (Smyth 635, 654; par. 2787, 2895). Perhaps it is possible that *ἄρα* receives the AuxZ label when next to a pronoun, and AuxY in other cases, but a rule of this kind could be formulated only after more research is done. Of all the particles listed in Smyth (Smyth 631-671; par. 2769-3003) we would suggest that some necessarily take the label AuxZ: *καίπερ* with participles, *μά, ναί* and *νή* with accusative, and *πέρ*.

5.3. ExD

In Celano’s annotation scheme, “The label ExD is used for those constituents that do not syntactically belong to a sentence, such as vocatives and the head of a parenthetical clause. They are appended to the PRED node” (Celano). In the case of [example 4](#), we find the particle *δέ* within the parenthetical clause. If it is to be labelled as COORD, the head of the parenthetical clause (the verb *προσάπτουσι*) cannot be appended directly to the PRED, therefore violating the relevant rule. If the predicate of the parenthetical clause (*προσάπτουσι*) is appended to the PRED, the particle must then be labelled AuxY, which is inappropriate since it is considered a conjunction (see 5.2). The former option was chosen.

Example 4: particle *δέ*



6. Treebanking in teaching Ancient Greek: advantages and problems

The use of treebanking in teaching Ancient Greek leads to a greater understanding of Greek syntax and relationships between parts of speech in a sentence, but it's not all smooth sailing since there are some gray areas and things that can be interpreted in more than one way. To start with, the student is required to think and to deeply understand the sentence. Instead of just using morphological and syntactic analysis to break down a period, treebanking introduces the semantic layer. Having to connect each word to exactly one other word and having to determine their relation makes the student think about the usage and precise meaning of a word or an expression. Sometimes it is easier for the students to explain and discuss something in metalanguage than translating into their mother tongue. Treebanking also helps notice the valence of verbs, certain sentence structures, parallelism etc. It should also be mentioned that the straightforward and intuitive tree structure visualization and morphological colours (at least when using Perseids) help a great deal to make the sentence clearer, especially when analysing highly complex periods. Some students also experience treebanking as more fun than a purely translational approach and enjoy the opportunity to have a linguistic discussion in class.

On the other hand, dependency treebanking is based on dependency syntax theory, which differs from what most teachers and professors use in everyday classes. Students are traditionally taught that the participle is necessarily an attribute, objects are either in accusative (direct objects) or dative (indirect objects) without prepositions, prepositional phrases cannot be attributes, and not much attention is paid to particles, which are a problematic part of speech in themselves. The adverb-or-object debate can be especially frustrating, and the analysis of relative clauses can seem counter-intuitive.

Conclusion

The differences between the traditional approach and the guidelines proposed by Bamman and Crane and Celano can be confusing and counter-intuitive and it takes some time for the students to adjust. Therefore, this approach is appropriate for higher education levels (the final year of a BA program, MA program), while at a lower level (early BA, even high school) simplified sentences should be analysed. Although there are some downsides to using treebanking as an educational tool, especially in the areas

where there is some ambiguity or lack of clarity (one could argue, though, that this is true for any kind of linguistic description), we are certain that treebanking has not only a great research potential, but also a bright didactic future.

Works cited:

- Abteilung Automatische Sprachverarbeitung, Institut für Informatik, Universität Leipzig. DFG-Projekt: Überarbeitung, Standardisierung und Erweiterung der "Ancient Greek and Latin Dependency Treebank" <http://asv.informatik.uni-leipzig.de/projects/41>. 2019. Accessed on 15 January 2019.
- Bamman, David, Gregory Crane. *Guidelines for the Syntactic Annotation of the Ancient Greek Dependency Treebank (1.1)*. The Perseus Project, Tufts University. <http://nlp.perseus.tufts.edu/syntax/treebank/greek.html>. September 1, 2008. Accessed on 15 January 2019.
- Bamman, David, Marco Passarotti, Roberto Busa, Gregory Crane. *The Annotation Guidelines of the Latin Dependency Treebank and Index Thomisticus Treebank: The Treatment of Some Specific Syntactic Constructions in Latin*. 2008. www.lrec-conf.org/proceedings/lrec2008/summaries/25.html. Accessed on 15 February 2019.
- Lukijan. *Djela*. Translation and introduction by Marina Bricko. Matica hrvatska 2002.
- Celano, Giuseppe G. A., Gregory Crane, Bridget Almas & al. *The Ancient Greek and Latin Dependency Treebank v.2.1.*, http://perseusdl.github.io/treebank_data/. 2018. Accessed on 15 January 2019.
- Celano, Giuseppe G. A. *Guidelines for the Ancient Greek Dependency Treebank 2.0*. https://github.com/PerseusDL/treebank_data/blob/master/AGDT2/guidelines/Greek_guidelines.md. March 19, 2018. Accessed on 15 January 2019.
- Crane, Gregory (editor in chief). *Perseus Digital Library*. <http://www.perseus.tufts.edu/hopper/> 2007. Accessed on January 15th 2019.
- Lucian. *Works*. Translated by A. M. Harmon, Harvard University Press and William Heinemann Ltd. Vol. 1. 1st ed. 1913. Reprinted 1961.
- Lucian. *Selected Dialogues*. Translated with an Introduction and Notes by C. D. Costa, Oxford University Press, 2005.
- Nivre, Joakim. *Dependency Grammar and Dependency Parsing*. 2005. <https://cl.lingfil.uu.se> Accessed on 15 February 2019.
- Perseids. <http://sites.tufts.edu/perseids/>. 2017. Accessed on 15 January 2019.
- Richter, Daniel S. "Lucian of Samosata." In: *The Oxford Handbook of Second Sophistic*. Edited by Daniel S. Richter and William A. Johnson. Oxford University Press, 2017, pp. 327-344.

Roberts, Adam. *The History of Science Fiction*, 2nd ed. Palgrave Macmillan, 2016.

Roberts, John (ed.). *The Oxford Dictionary of the Classical World*. Oxford University Press, 2005.

Smyth, Herbert Weir. *Greek Grammar*. Copyright 1920 by Herbert Weir Smyth. Harvard University Press, 1984.

The use of relational databases in epigraphy: a case study

Silvia Gazzoli

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Abstract: The study of an abundant number of inscriptions leads to the conception of schemas and forms that can be organized into databases. This procedure allows us to arrange information with precision and to draw data and create connections between them in quickly and easily. For this reason, the relational database model has proved to be a valid support, as it makes possible to arrange data and information logically according to pre-established constraints and relationships, reducing errors and repetitions. The aim of this paper is to present an example of the use of a relational database created to catalogue inscriptions and highlight the positive aspects and difficulties found out during the process. The complexity of this method is mostly related to making choices about entities and identifying relationships between them; another obstacle is connected to the complexity of inscriptions as group of words and *formulae*. Nevertheless, the relational database allows the researcher to mix up data and information and create new relationships between them using SQL operators. The software used for the case study that will be presented in this paper is an open source administration and development platform pgAdmin (for PostgreSQL).

Keywords: epigraphy, inscriptions, database, open source

1. Introduction

The aim of this paper is to present a case study related to a research project regarding infant mortality in Northern Italy during Roman Times based on inscriptions and archaeological evidences (The case study presented in this paper is part of the PhD project "*La mortalità infantile in Italia Settentrionale in epoca Romana. Il contributo*

della documentazione epigrafica ed archeologica”). The implementation of the project could represent an example for the use of open source relational databases in the context of historical and epigraphic researches. The use of an RDBMS could also be interesting in this particular field due to a simpler and more organized management of the documents listed in the catalogue.



Fig. 1. Map of the Regiones (Augustean Regions) cited, from www.stilus.nl (modified by the author)

The study of several hundred inscriptions belonging to a well-defined topographical context, as the Roman region called *Cisalpinga* (corresponding to today's Italian region *Friuli Venezia Giulia, Veneto, Trentino Alto Adige, Lombardia*, part of the *Emilia, Piemonte, Liguria and Valle d'Aosta*) during a period of time that starts from the so called "Romanisation", a sort of transition phase that took place in this area from the second half of the first century B.C., to the end of the Western Roman Empire in the late Vth century A.D., led to the creation of a catalogue. Later a database was conceived to organize and manage inscriptions and archaeological finds related to infant mortality (This project also includes the georeferencing of archaeological and epigraphic evidences through the use of the open-source software QuantumGIS. Methodological reflections and cases studies were presented at two Archeofoss/GFoss conferences in Cagliari 2017 and Rome 2018).

The introduction of the use of the RDBMS for a simpler management of the epigraphic and, more generally, historical data was more complex than expected. Although, this way of organising and georeferencing information, is frequently used for storing archaeological finds (Fronza 2000; Fronza 2003; Fronza 2009; Anichini *et alii* 2002), it has rarely been used in connection with historical and epigraphic documentation.

2. The epigraphic evidence: an overview on heterogeneous documents

The first fundamental step is the definition of the characteristics of the data to be listed and organised within the database. Latin inscriptions, particularly epitaphs, represent a well recognizable group of documents usually defined by recurring phrasal structures, constructions and formulae. However, many of the inscriptions studied present some variables in the text, or differences in the structure, mainly due to the wide chronological period and the topographical distance that could exist between some of these documents. Other dissimilarities could be related to the funeral rituals often mentioned or suggested in the epitaph (in a few epitaphs the noun “*ossa*” is mentioned, which is probably related to the funeral ritual of cremation and it consequently indicates the ashes preserved in the ossuary; in only one document listed in the catalogue the specific term “*cineres*” is cited which also refers to this practice, see also Scaletta, EDR140804). Some of these differences, such as the absence of *formulae* or the presence of variations, are essential from an epigraphic point of view and need to be highlighted in the database. Interesting considerations regarding these evidences can be supported using three epitaphs as examples: these documents are related to various chronological periods and to different sites of provenance but are all connected to the main topic of this research, that is to infant mortality. The first one, from the famous Roman city of Aquileia, has been found inscribed on an ossuary and belonged to III c. B.C. “*Sabini / ann(orum) X*” (Inscription from Aquileia, CIL V, 8450, also listed in the *Ubi erat Lupa* online catalogue, no. 16123). In this short epitaph the information is scarce and limited to the name of the deceased (in the genitive case), *Sabinus*, and not too accurate biometric data, as it only specifies that he lived for ten years. The age of the child is not stated with the usual *formula*: “*qui/ quae vixit*” (Di Stefano Manzella 1987 223-224) followed by precise indications of the years, months and days lived, but it is more concise.

The second epitaph was found in Visinada, in Istria (Croatia) and was dedicated to a young boy, named *Florentinus*, by his parents, *Eutyches* and *Successa*: “*D(is) M(anibus) / Florentino / annorum VIII[I] / parentes fe/cerunt Euty/[ch]es et Successa*” (EDR134214 by V. Zovic, 10/12/2013). After the *adprecatio* to the *Manes*, the epitaph

cited the name of the young deceased, *Florentinus* (probably a diminutive of the name *Florentius*), the years lived before death and the names of both the parents. A third example of funeral inscription regarding a child, in this case a girl, was found in the city of Alba, near Cuneo in Piemonte “*Castriciae / Saturninae fil(iae) / vixit ann(os) VI ((semis)) / P(ublius) Castricius Saturnin(us) / pat(er) mag(ister) Aug(ustalis) Polle[t(iae)] / Aug(usta) Bagienn(orum) sibi e[t] / Mettiae Paulin[ae] / uxori optim[ae]*” (Inscription from Alba, Cuneo, Scheda EDR081081 by L. Lastrico, 24/09/2007). This text is very interesting due to the structure of the epitaph and the information given regarding the social *status* of this family (Mosca 1957, 8). The first line gives the name of the deceased, Castricia Saturnina, who lived for six and a half years (*semis*) and who was the daughter of *Publius Castricius Saturninus* (who was *magister Augustalis* of *Pollentia in Augusta Bagiennorum*) and *Mettia Paulina*.

A very important factor is represented by the presence of *formulae*, which are a characteristic of funeral epigraphy: these parts of sentences can be easily schematized thanks to their uniformity and repetitiveness. However, they also display copious variables (probably related to local customs, chorological trends or mistakes) that can represent a problem during the data input phase. An example could be the *adprecatio* to *Manes* (the *Dis Manibus* initial sentence): this *formula* is highly documented not only in the area that was studied in this project, but in the whole Roman Empire, and for a very long period. It is possible to spot some variations in this introduction to the epitaph, such as *Dis Manibus*, *D(is) Manibus*, *D(is) M(anibus)*, *Dis Manibus Sacrum*, *D(is) M(anibus) S(acrum)*, not considering mistakes made by the *scriptor* or blanks caused by damage in the surface material used. A second example of the use of *formulae* in the first lines of epitaphs is related to the consecration of the monument to Memory, *Bona Memoria*, in order to preserve the memory of the deceased. The sequence of words used to dedicate funeral monuments to this particular deity could be: *Bona Memoria*, *B(ona) M(emoria)* or *(Bona) Memoria*. In general, in the whole catalogue, six different opening *formulae* were found, with corresponding variations (Raepsaet-Charlier 2002).

Thus, remaining in the context of the conventional parts of the epitaph, as was probably already evident from the proposed examples and from the topic of this research, it is extremely important to pay attention to the methods used to provide information regarding the biometric data, and therefore to the duration of life of the deceased. In this case, six additional expressions were found, not only characterized by *formulae*, but also using variations of the grammar complement related to age. The canonical expression *qui/ quae vixit* followed by the specification of year, month and day, is often replaced with the genitive of age, constructs of the verb “*ago*”, adjectives, such as *anniculus*, (Neraudau 1984) nouns and participle followed by different cases.

There are also various syntactic constructions used for the expression of the date of death or burial, widely used in contexts of Christian religion, but also the indications relating to the place of burial of the ashes, or of the corpse itself of the deceased.

In various inscriptions some iconographical elements can be found in the area of the epitaph, so in strict relationship with the text, that can be essential for dating the document or including it in a particular religious context. Regarding the decoration of the text, an extremely important element that deserves to be mentioned in the catalogue is the so called "*hedera distinguens*", that can contribute to the identification of the possible date given its chronologically limited use. The iconographic endowment of an inscription from the Christian era is much richer; the text of the epitaph is often interspersed with symbolic elements such as Christograms, representations of animals like fish or birds, images related to the phases of life of a Christian (e.g. representations of christening) and to the religion itself.

The epigraphic document consists not only of the text, that is the inscription, but also of the iconographic set and of the artefact that constitutes the surface material used, that could be a stone, or an object of small dimensions. Funeral inscriptions can usually be found written on different kinds of surfaces: they can be made of local stone or polished marble, or of other kind of objects like roof tiles and amphorae. The study of the material, usually, does not usually provides information related to dating the monument and the inscription, except in some special cases, but it allows us to draw hypotheses regarding the economic, commercial and productive context of provenance. In fact, evidence regarding the material used to fabricate the monument is fundamental, not only when it comes to imported Greek marble, but also when it is possible to identify local lithotypes or stones from excavated areas close to the place of discovery.

Among the most attested surface material discussed in this paper, are certainly *stelae*, found both in marble and in local limestone, memorial stones, altars and ossuary. On the other hand, sarcophagi, bases and block are less common, although still present. In addition, reused materials have been found: although it is difficult to propose hypotheses on the original nature of these, in the light of the completeness of the study this evidence must still be mentioned.

In addition, the surface material can be covered with an extremely elaborate iconographic apparatus, often, but not always, in connection with the text of the funeral inscription. In the documentation gathered in the catalogue *stelae* are listed which are decorated with images of children, alone or with their families. In several cases, it was also possible to identify iconographies related to funereal symbology, such as animals (e.g. peacocks) or plants and fruits (e.g. pomegranates) connected to the underworld and to eternal life.

Several inscriptions turn out to have been lost; information about some of these are kept only thanks to the *Corpus Inscriptionum Latinarum*, so they are, except in rare cases, devoid of images, descriptions or detailed studies related to the ductus or to the surface used. Others, on the other hand, have been found and studied in more recent times but unfortunately have been lost or researched without providing any results (it is not unusual to find in contemporary digital catalogues the Latin formula *frustra quaesivi* in the field dedicated to the place of conservation) during updates of the catalogues or collections. An example of an epitaph listed in the *Corpus* but gone missing could be number 3172 from CIL V: the document found in the vicinity of the modern city of Vicenza, consisted of an epitaph regarding a boy named *Fortunius* who died at the age of 3 years, 7 months and 6 days “*D(is) M(anibus) / Fortunio / filio karissi/mo q(ui) vi(xit) an/n(is) III m(ensibus) VII d(iebus) VI / parentes pientissimi / v(ivi) f(ecerunt)*” and a very interesting decoration. The distinctive trait lies in the description provided by the author of the CIL profile, which shows the presence of a decorative apparatus both after the *adprecatio* formula with a *protome* (maybe a child image?) and at the end of the text. This last depiction is described with the following words “*puer stans ante eum pavo*”, so there was probably an image of a child with a peacock in front of him. (CIL V, 3172).

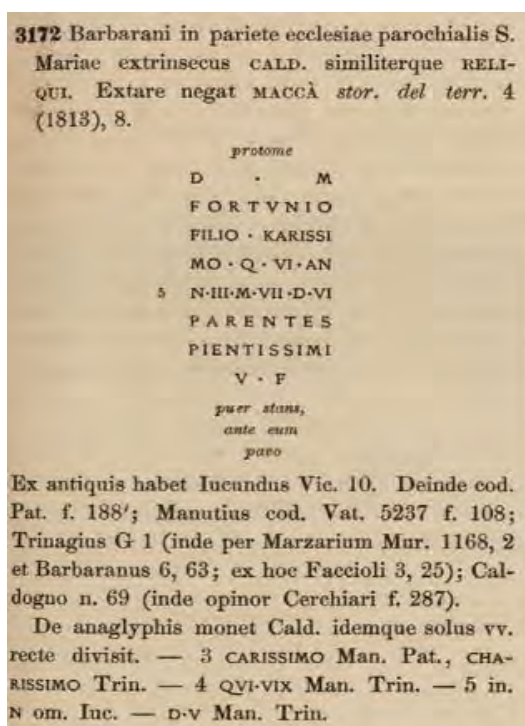


Fig. 2. Picture of the epitaph's form in the *Corpus Inscriptionum Latinarum* (picture by the author)

2. Methodological issues and possible solutions

The mass of materials briefly described above leads the scheduler to pose questions about the nature and the characteristics of the most suitable database for the storage and the consequent fruition of the data. A first hypothesis, certainly simpler in its realisation, could be the creation of a single table with each line corresponding to an inscription and each column containing a particular characteristic or a piece of information. This first and simpler option, however, although it may seem more manageable in case of further and subsequent changes, does not ensure adequate control over possible typing error, and would allow a limited use of data without being able to propose particular functions. A second option was the creation of an Entity-Relationship Model Database, both realizing the Logical and Conceptual models in the design phase and developing the data structure. The opportunities offered by this type of database are unlimited, both from the data storage point of view and from the possible use of the information listed through the various functions offered by the SQL languages. A further point in favour of choosing an entity-relationship database is the reduced percentage of errors obtained by compiling firstly the slave tables and then inserting information into the master ones through the closed selection deriving from the relationships between them.

However, this precautionary design phase highlighted some methodological problems that also reflected on the setting of the extended catalogue, leading to some changes in the form's structure that subsequently became necessary.

The first problem to highlight is related to the place where the inscription was found: when the evidence was discovered during an archaeological excavation or circumstances that allowed its exact topographical registration, this information is considered reliable and it is inserted in the catalogue's form. Conversely, several epitaphs have passed through private collections before arriving in the museums where they are now stored. In these cases, some data, especially that regarding the site where the document has been found, has been lost. This can therefore not be included in the relative form, or database table, requiring the creation of a new entity for the database regarding only the location of the various collections mentioned in the catalogue and the information provided by their registers. Likewise, it was necessary to create a table related to the inscriptions on re-used material and only afterward exhibited in museums. Even in this case important information regarding the original discovery site was lost and the place of reuse could not be included as the place of discovery because it would be a methodological error (not only related to the database but to the study of the monument itself). To compensate for this problem

in the structure of the database, an additional table has been added for re-used materials in order to store information as accurately as possible about these documents. The data regarding the discovery, therefore, can be inserted into a textual field that does not provide the NULL value to avoid a compilation error, but rather uses the word *ignoratur* (not known) in cases of lack of information, or even better the definition “*re-used document*” that would then lead to its slave entity.

The second problem is related to the very same inscriptions: from the concise examples provided in the previous paragraphs it is possible to understand how the document studied, catalogued and on their way to being inserted into the database, are extremely different both as regards the presence of *formulae*, or not, and for the length of the text (an example is the inscription of *Lucius Trebius Divus*, see Zoia 2015, EDR124801). Firstly it was proposed to create a subdivision of the text into parts, thus highlighting the *formulae* or opening lines of the inscription, then a second section dedicated to memory, to underline words used to remember the young deceased, and to the dedication, a third for the biometric data and a fourth for the closing lines of the epitaph with *formulae* or the call to the reader. Yet, there are only a few documents that fully reflect this pattern. Certainly, inscriptions on ossuaries distance themselves from this structure as they bear much more concise information, and at the same time some *stelae* or *tabulae* are accompanied by extremely complex texts. In addition, several inscriptions not only report the memory of the young deceased, but also associate him or her with other characters, still alive, already dead or deceased in the same period (ILCV 847 = Novillo Lopez 2014, EDR139687). It would be very difficult to include these cases in the previously proposed schema, because it would probably lead to the loss of some information or to risk falling into errors, distorting meanings or underestimating the importance of certain data.

A further problem brought by the choice of this option would be to lose the unity of the text, favouring only some of its parts. For this reason, a second option was chosen, perhaps more complex from the implementation point of view, and, unfortunately, more prone to the production of possible errors, but at the same time it is the most common for other on-line database used for storing and sharing inscriptions. It consists of the creation of a field, called *testo_iscrizione* (text_inscription), with very few restrictions and a practically indefinite length, in text form, with the impossibility of the NULL option, for the transcription of the entire inscription accompanied by terminations. In this way the text is not partitioned or restricted within tables that are excessively rigid, but there is still a high percentage of possible error for the compiler, who therefore must list text without the possibility of retrieving data from the slave tables usually offered by this type of database.

It is therefore right to propose some considerations regarding methods of carrying out research or activating selections and functions working with text fields of variable length and in the absence of further references. To try to overcome this problem Boolean fields were inserted (that is containing only the true/false possible values) followed by a further field, with “nullable” definition, with the specification of what was previously briefly reported. For example, while inserting in the database information about the above-mentioned inscription regarding *Sabinus*, in the field concerning the presence of an opening formula it is enough to reply by leaving the relative square empty (so the Boolean answer is “false”) and consequently not filling in the following field. Otherwise, in the case of the inscription in memory of *Florentinus*, the compiler would cross the square (as the answer is “true”) and then in the following field specify from the cascade menu the presence of the *adprecatio* to the Manes. This relationship between two tables could lead to further information in the related table concerning opening formulas, where chronologies and detailed studies are listed.

The presence of columns with stringent limitations, such as Boolean fields, allows us to structure relationships between tables to take advantage of the flexibility offered by the relational database.

As we have seen, the inscriptions studied in this project, contain a large amount of information and the peril of losing them, or making them difficult to use, represents the most feared risk of this work. Some of this data are related to the young deceased, whose memory is preserved only in these documents. Until now this paper was focused on the possible options to schematize or summarise inscriptions’ texts, analysing problems related to *formulae*, length of the epitaph, sites of discovery. A more important element concerns the people mentioned in the epitaphs; this project does not concentrate only on studying inscriptions from a precise topographical area but also is related to archaeological evidences and demographical considerations. For this reason, it was also necessary to hypothesize a way of creating connections between tables/entities concerning inscriptions with the ones related to the deceased children mentioned in it. In order to be useful for the research, these tables have to contain information about biometric data, families, social status and, when possible, provenance.

The unifying element of all these evidences can not be the catalogue number of the single inscription; although, it connects both the epigraphic text and the children mentioned in it, and all the information regarding surface material used, place of discovery and museum where the inscription is preserved, in several inscriptions more than one child is mentioned. The choice for the primal key, then, must therefore fall on an automatic identifier that allows the identification of every individual deceased. Given the different possibilities offered by the epitaphs regarding the explication of

the biometric data, and consequently, of the children's age at the time of death, a table has been created called "*gruppi_eta*" (age_group). In this entity groups are listed which, based on the information provided by literary and legal sources relating to childhood, allow us to include the range of options mentioned in the inscriptions.

Referring to the most famous authors and taking up what was written by Neraudau (Neraudau 1984) in his famous contribution on Childhood in the Greek and Roman world, the life of a Roman was marked by several passages, especially when he was young. According to Varro, the stage called "*pueritia*" consisted of a long period that ranged from birth to the age of 15, ideally when the *puer* became an adult. On the other hand, the articulation of passages described by Isidoro from Siviglia provides a narrowed periodization, which consist of *infantia* (from birth to the age of 7), the subsequent *pueritia* (up to 14 years old) and in the *adulescentia*, that ended at the age of 28 years. However, according to the modern literature on the subject (Laes 2011), the steps that marked childhood and continued until the age of maturity were much denser, especially in the Roman world. For this reason, and to avoid the repetition of data already filed in entities regarding epitaphs, these "age groups" reflect as much as possible the stages of growth and at the same time allow a greater schematization of the evidences provided. The first group goes from birth to three years old; as reported by ancient sources at this age there was the end of breastfeeding and the beginning of weaning. The second one goes from three to seven years old. At this age there was a sort of "social division by gender" the young males started to go to school and live outside the house, while young females were introduced to domestic activities along with the other women of the family. The last group goes until the age of twelve for the girls: at this age puberty has usually started and sexual maturation was one of the requisites for legal marriage. For young boys adulthood had not a precise starting point related to physical maturation, but they usually changed the toga at the age of 15, so this is the upper limit for the last age group. Thanks to these clusters, which were included in a table, it was possible to synthesise biometric information provided in the inscription in order to carry out demographic and social studies without having to limit data due to schematization.

3. The Software

During the design phase of the database's structure was chosen an open source product that would easily allow interfacing with the georeferencing open source software that is most commonly used in the archaeological field, that is QuantumGIS (<https://qgis.org/en/site/>). This program itself provides several plugins in order to facilitate

the creation of a database to storage information related to georeferenced data and one of this is a connection to a PostgreSQL (<https://www.postgresql.org/>) database. Although several university projects are based on the use of proprietary software, such as ArcGis for the georeferentiation and Microsoft Access for the database (Anichini, Paribeni 2005), for this research open programs were chosen, in order to enhance the increasing attention given to the open source movement.

PostgreSQL represent a very interesting object-related database system that is based on SQL language and has more than 30 years of active development so its use can be supported by a good amount of documentation and by a careful and active community of users and developers. For a better and easier use of PostgreSQL and to facilitate the future connection with QuantumGIS a graphical administration tool was selected, the most highly recommended one, PgAdmin (<https://www.pgadmin.org/>).

4. The outlook

While the physical structuring phase of the database is still in progress, some tests were carried out to identify possible problems with the insertion of data and their subsequent use. The employment of preparatory schemes and the preliminary organisation of tables and columns' constraints, as mentioned before, allowed us to highlight some problems that only partially have found a solution. This work-in-progress project is highlighting how the use of relational databases, widely attested in other similar disciplines like archaeology, represent a challenge in the epigraphic field, especially when dealing with complex researches and not only with the simple cataloguing of inscriptions. The aim of this project, and therefore of this paper, is to present and develop a database that allows both the listing of epigraphic documents in the most accurate way possible, and the highlighting of the content of the texts studied thanks to different tables. The possibility of underlining the relationships between the people mentioned in the epitaphs, their possible status within the community of origin, together with the georeferencing of the documents could represent a new possibility of work for epigraphic projects linked to small or medium sized regions.

Works Cited

Anichini, Francesca; Fabiani, Fabio; Gattiglia, Gabriele, Gualandi Maria Letizia, "Un database per la registrazione e l'analisi dei dati archeologici", in *MapPapers* 1 – II, 2012, 1-20.

- Anichini, Francesca and Paribeni Emanuela, "Il Gis archeologico della città di Pisa. Primi risultati per la tutela e la gestione del patrimonio archeologico pisano" *Notiziario della Soprintendenza archeologica della Toscana*, 1, 2005, 205-210.
- Di Stefano Manzella, Ivan. Il mestiere di epigrafista: guida alla schedatura del materiale epigrafico lapideo. Quasar, Roma 1987.
- Fronza, Vittorio, "Il Sistema di gestione degli archivi nello scavo di Poggio Imperiale a Poggibonsi. Una soluzione all'interno della soluzione GIS", *Archeologia e Calcolatori*, 11, 2000, 125-137.
- Fronza, Vittorio, "Principi di database management in archeologia: l'esperienza senese" *III Congresso Nazionale di Archeologia Medievale* edited by Fiorillo R., Peduto P., All'insegna del Giglio, Firenze, 2003, 629 – 632.
- Fronza, Vittorio "L'archiviazione del dato in archeologia", *Informatica e Archeologia Medievale. L'esperienza Senese* edited by in Fronza V, Nardini A., Valenti M., All'insegna del Giglio, Firenze, 2009, 1-15.
- Laes, Christian. Children in the Roman Empire. Outsiders Within, Cambridge University Press, Cambridge 2011.
- Mosca, Edoardo. *Le epigrafi del Museo di Storia e d'Arte di Bra*, SASTE, Bra, 1957.
- Neraudau, Jean-Pierre. Etre enfant à Rome, coll. Realia, Les Belle Lettres, Paris, 1994.
- Raepsaet-Charlier Marie-Therese. Hic situs est ou Dis Manibus. Du bon usage de la prodence dans la datation des épitaphes gallo-romaines in *L'antiquité classique*, vol. 71, 2002, 221-227.

Inscriptions Cited

- Scheda EDR140804 by C. Scaletta (11/14/2015) = CIL V 2417 = CLE 1157 (Found in Ferrara, dated in the half I c. A.D.)
- Scheda EDR134214 by V. Zovic (10/12/2013) = CIL V, 8195 (Found in Visinada/Vizinada, date unknown)
- Scheda EDR139094 by M. A. Novillo Lopez (18/08/2014) = Brusin 1993, nr. 3214 (Found in Aquileia, IV c. A.D.)
- Scheda EDR139687 by M.A. Novillo Lopez (22/07/2014) = ILCV 847 (Found in Aquileia, IV c. A.D.)
- Scheda EDR146314 by C. Girardi /11/01/2015) = CIL V, 3172 (Found in Vicenza, date unknown)
- Scheda EDR124801 by S. Zoia (23/02/2015) (Found in Milan, III- IV c. A.D.)
- Scheda EDR081081 by L. Lastrico (24/09/2007) = CIL V, 7604 = ILS 6749 (Found in Alba, II c. A.D.)
- CIL V, 8450 = EDCS01601269 = Ubi Erat Lupa nr. 16123 (Found in Aquileia, date unknown)

Romans 1by1. A Database Manual

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Abstract: The present paper has the goal to document the usage of the Romans 1by1, a database which records the people attested in the epigraphic sources coming from the Roman provinces; so far, we have registered Dacia, Moesia Inferior and Moesia Superior in full and are currently working on the epigraphy of Pannonia. The information started to be collected in 2015, and it is still in progress, the intention being to extend the geographical area as much as possible. The database represents an extremely useful resource in the study of ancient population, as well as a very user- friendly research tool, which allows primary browsing and selective, advanced searches alike.

Keywords: database, guidebook, Latin epigraphy, population database, database architecture

Introduction & Structure

The database has two components, one which is designed for account-based users, respectively to the researchers who are continuously building the database, and another one, which is an open access database designed for public use. The architecture, principles and functioning mechanisms of the first one have been partially documented (Varga, “Documenting”; Varga, “New Developments”; Varga et al.; Varga and Lumezeanu), but in the following lines we will address both platforms in order to provide a guide for the user.

After the introduction we will present a short overview of the historiography of the research, followed by the documentation of the central database and by the brief presentation of the dissemination (open access) database, concluding with some of the differences between the two of them.

Historiography of the research

Databases have started to be used in the humanistic field in the last decades, being applied in various research projects from a variety of sub-fields, from history, to linguistics, geography, demography, etc. As such, a need to document them has emerged, producing as a result a wide variety of database manuals. For historical demography, the article of Mademakers and Dillon is a point of reference, since it provides a list of “best practices for the creation of large databases on historical populations” (34). Other articles document various databases, or present some of their major contribution and use, as such we mention the IFO Prussian Economic History Database – iPEHD (Becker et al.), the spatial database for medieval fiscal data in Southern Italy (Carrion et al.), or the North Atlantic Population Project (Rugglers et al.), etc. Specific research questions and the use of specific methodologies have been also at the core of some articles, such as the one of Hedefalk, Harrie and Svensson whom developed “a methodology to create databases that can be used to add micro-level geographic context to longitudinal historical demographic analyses” (153). Huistra and Mellink on the other side focused on the search technologies which are better designed for “historical source selection in digital repositories” (220), while Massey assessed the accuracy in linked historical data, etc.

The central database:

The first and foremost step that the user needs to take is to become familiar with the source, which implies the reading of the inscription and its translation, as well as of all the other details regarding it. As such, the first edition of the inscription should be used, as well as any newer editions which bring significant contributions to its reading or interpretation (Fig. 1).

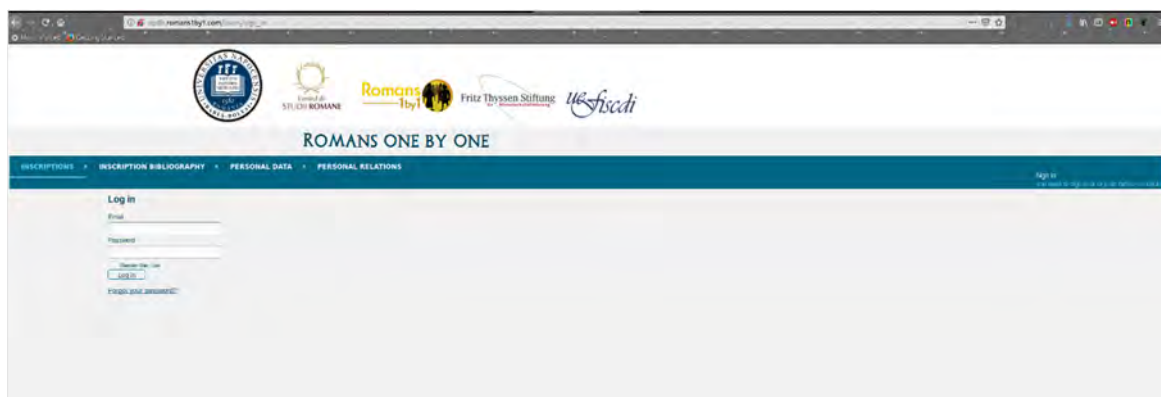


Fig. 1. Log-in interface of the database

The database has four main tables (inscriptions, inscription bibliography, personal data, personal relations) and each of their corresponding record sheet have three main types of fields:

- 1) fill-in box, in which the author introduces the information (the comments are in English, but the other information is recorded in the language of the source);
- 2) drop-down menu, from which the user only selects the information;
- 3) check-in box, where the user makes a decision between two opposite choices (yes/no). The selected state opens sometimes new data sets.

Inscriptions

The first step in creating an entry is generating a new inscription record, more precisely, the author presses the button **New inscription record** and creates a new file (Fig. 2). The author gives to the chosen inscription a code of five digits (i.e. 00001) ending with an acronym representing the abbreviation of the province's name (MI for Moesia Inferior, MS for Moesia Superior, DP for Dacia Porolissensis, DI for Dacia Inferior, DS for Dacia Superior, PI for Pannonia Inferior, PS for Pannonia Superior) (i.e. **00001MI**).

The screenshot displays the 'ROMANS ONE BY ONE' database interface. At the top, there are logos for the University of Bucharest, the Center of Studies in Roman Epigraphy, the 'Romans 1by1' project, Fritz Thyssen Stiftung, and the 'US fisci' logo. Below the logos is the title 'ROMANS ONE BY ONE' and a navigation bar with tabs for 'INSCRIPTIONS', 'INSCRIPTION BIBLIOGRAPHY', 'PERSONAL DATA', and 'PERSONAL RELATIONS'. On the left side, there is a vertical sidebar with a list of categories: ETHNICITY, LANGUAGE, MATERIAL, CITY/TOWN, GENDER, SACERDOTAL FUNCTION, OCCUPATION, MILITARY UNIT, MILITARY RANK, POSITIONS, TRIBUS, INSCRIPTION TYPE, RELATIONS, PROVINCES, GENERAL BIBLIOGRAPHY, and USERS. The main content area is titled 'Editing Inscriptions' and contains two columns of form fields. The left column includes: 'Inscription code' (text input with '00001MI'), 'Type of inscription' (dropdown menu with 'Funerary'), 'Type of instrumentum' (text input), 'Language' (dropdown menu with 'Greek'), 'Material' (dropdown menu with 'Marble'), 'Relevant expressions' (text input), 'Stylistic details' (text input with a note: 'The upper part of the monument represents a man standing inside a temple: 12 columns and a fronton'), and 'Atypical features' (text input). The right column includes: 'Observations' (text input), 'Province' (dropdown menu with 'Moesia Inferior'), 'Place of discovery' (text input with 'Constanța'), 'Place of provenience' (text input with 'Constanța'), 'Ancient name provenience' (text input with 'Tomis'), 'Timezone/Timeline' (text input with '2nd CAD'), and 'External links' (text input with 'http://epigraphy.packhum.org'). At the bottom of the form, there are 'Save' and 'Show | Back' buttons.

Fig. 2. New inscription file

Next, from a drop-down menu the operator selects the **Type of inscription** (funerary, votive, etc.), followed by filling in **Type of instrumentum** (ring, tile, etc.) if appropriate. From different drop-down menus, the **Language** (Greek, Latin, etc.) of the inscription is chosen, and the **Material** (marble, sandstone, gold, etc.) from which the monument was made. These are followed by four textboxes which are to be filled in if the information exists: **Relevant expressions** (*ex viso libenter, aedem vetustate conlapsam – sic!*, etc.), **Stylistic details** (*pulvini*, marble stele with pediment and acroterion, etc.), **Atypical features** (on a column, written DD MM, etc.), and **Observations** (any additional information on the source which the author of the record considers relevant and which do not fit any of the other fields).

Continuing, a drop-down menu allows the user to select the **Province** (Pannonia Inferior, Moesia Superior) from where the inscription comes, and then five other text fields are to be filled in: **Place of discovery** (Orăştie, Lyon, etc.), **Place of provenience** (Sarmizegetusa, Lugdunum, etc.), **Ancient name of provenience** (Sarmizegetusa, Lugdunum, etc.), **Timestamp/ timeframe** (2nd-3rd c. AD, 101-107 AD, etc.) and **External links**. In what concerns the external links textbox it is filled in with links from the EDH (<https://edh-www.adw.uni-heidelberg.de/home>) and PHI (<https://epigraphy.packhum.org/>) databases. The final step is to click the **Save** button. Once this has been done, the inscription record is created and the next step can be taken.

Inscription bibliography

After recording the inscription, the following step is to create a bibliographic file. The author presses the button **New bibliography inscription** in order to create a new entry (Fig. 3). At this stage, from a drop-down menu the previously recorded inscription code is selected and then again, from a drop-down menu, the **Bibliography abbreviation** (CIL, AE, etc.) is also selected. The table **General Bibliography** contains the complete bibliographical list, with all the titles referred to in the database and their corresponding abbreviations and the drop-down list is referenced to it.

The screenshot shows the 'ROMANS ONE BY ONE' database interface. At the top, there are logos for Universitas Napieriana, Centus de STUDIIS ROMANE, Romans 1by1, Fritz Thyssen Stiftung, and Ue fisci di. Below the logos, the title 'ROMANS ONE BY ONE' is displayed. The main navigation bar includes 'INSCRIPTIONS', 'INSCRIPTION BIBLIOGRAPHY', 'PERSONAL DATA', and 'PERSONAL RELATIONS'. On the left, a vertical menu lists various categories: ETHNICITY, LANGUAGE, MATERIAL, CITY/TOWN, GENDER, SACERDOTAL FUNCTION, OCCUPATION, MILITARY UNIT, MILITARY RANK, POSITIONS, TRIBUS, INSCRIPTION TYPE, RELATIONS, PROVINCES, GENERAL BIBLIOGRAPHY, and USERS. The main content area is titled 'Editing Bibliography Inscription' and contains the following fields:

- Inscription code:** A dropdown menu with the value '01457PS' selected.
- Bibliography abbreviation:** A dropdown menu with the value 'CIL' selected.
- Details:** A text input field containing 'III 4394'.
- Comments:** A large text area for additional information.

At the bottom of the form, there is a 'Save' button and a 'Show | Back' link.

Fig. 3. New bibliography file

The text field **Details** (III 789; 1997, 1234, etc.) is destined to comprise the number of an inscription from an epigraphic *corpus*, or the page and the number under which an inscription was published. The **Comments** section gives the author of the record the possibility to insert any additional information regarding the publication. These fields are supposed to provide detailed bibliographic information related to the inscription. Considering the fact that most of the inscriptions have benefitted from various editions, several **Bibliography inscription** entries can be attached to an inscription code.

Personal data

The third and most important table is the **Personal data**, recording the prosopographic information. As such, the author passes to the personal data tab and clicks **New person data** (Fig. 4). This leads the user to a complex standardized informational sheet which allows oneself to fill-in/ select several types of information – given they are provided by the source, of course. Each recorded individual will be

automatically assigned a unique identifier, which is also comprised in the personal URI (e.g. <http://romans1by1.com/rpeople/32>).

The screenshot displays the 'ROMANS ONE BY ONE' website interface for editing personal data. The page has a dark blue header with navigation tabs: 'INSCRIPTIONS', 'INSCRIPTION BIBLIOGRAPHY', 'PERSONAL DATA', and 'PERSONAL RELATIONS'. A vertical sidebar on the left lists various categories: ETHNICITY, LANGUAGE, MATERIAL, CITY/TOWN, GENDER, SACERDOTAL FUNCTION, OCCUPATION, MILITARY UNIT, MILITARY RANK, POSITIONS, TRIBUS, INSCRIPTION TYPE, RELATIONS, PROVINCES, GENERAL BIBLIOGRAPHY, and USERS. The main content area is titled 'Editing Personal data' and is organized into three columns:

- Column 1 (Left):** Contains fields for 'Praenomen' (Publius), 'Ethnicity praenomen' (Roman), 'Nomen' (Aelius), 'Ethnicity nomen' (Roman), 'Cognomen/Personal name' (Marius), 'Ethnicity Cognomen/Personal name' (Roman), 'Father/Master name', 'Ethnicity Father/Master' (Select), 'Agnomen', 'Ethnicity agnomen' (Select), 'Observations agnomen', 'Signum', 'Ethnicity signum' (Select), and 'Observations signum'.
- Column 2 (Middle):** Contains fields for 'Natio', 'Ethnicity', 'Local Citizenship', 'Gender' (Male), 'Juridical status' (Citizen, Libertus/a, Veteranus, Peregrine, Slave), 'Tribus' (Select), 'Origo', 'Domus', 'Collegium/Association', 'Religious Position', 'Occupation', 'Duties', 'Age', and 'Details of life/death'. There are also checkboxes for 'Dedicated for:' and 'Dedicated by:'.
- Column 3 (Right):** Contains a section for 'Inscription code' with checkboxes for 'Ordo senatorius', 'Ordo equester', 'Provincial Governor', 'Procurators', 'Local Magistrate', 'Decurion', 'Pontarch', 'Imperial slave', 'Imperial freedman', 'Military personnel', 'Decorations', and 'Observations'.

Fig. 4. New person file

The sheet contains onomastic data, information related to the juridical status of the individuals, their ethnic and geographical provenience, social and religious background, professional status, *cursus honorum*, as well as other details of their life, such as the age, life events, or information regarding the person whom elevated the monument. In the following lines we will address each section and provide further details on the recording procedure.

The first section is **Onomastic data**; in this part there are fill-in boxes, followed by drop-down menus, each of the latter allowing the user to select the ethnicity corresponding to the name components. As such, from this onomastic category we have the following individual textboxes: **Praenomen** (Marcus, Caius, etc.), **Nomen** (Aurelius, Vireius, etc.), **Cognomen/ Personal name** (Regulus, Lucilianus, etc.), **Father/ Master name** (Zoticus, Titus, etc.), **Agnomen** (e.g. Passer; this category has also an **Observations** box attached), and **Signum** (as well, this category has also an **Observations** box; very scarce, we haven't registered any certain *signum* so far).

This being a standardized sheet, it means that not all of the information always appears on the inscriptions, as such, several particularities are to be mentioned. Obviously, in the case when an individual certainly did not have a *tria nomina* or a *duo nomina*, the textboxes are to be left empty, but, in the case when one of the component of the *tria* or *duo nomina* is not readable due to the physical condition of the monument, then the box should be filled in with the sign [---]. In case the personal name of an individual is missing, but the existence of a person is deduced from the text, the author may insert in the *cognomen/* personal name box either the word 'such' which is generally used in the literature when the name of an individual is missing, or the sign [---]. The latter is to be used especially in the cases when we have other onomastic details, such as the *praenomen* or the *nomen* of an individual. In general, for the Greek names we have opted to use, in these cases, the word "such", while when there were attested *tria* or *duo nomina* we have opted to use the sign [---].

In the cases where one of the components of the *tria* or *duo nomina*, or of the personal name is fragmentary, then the user is to insert in the textbox the letters, which are readable on the inscription. For example, if on the inscription we read only the ending of one's personal name "-ώπος", then the user will fill-in the box as follows: [---]ώπος (ID 463), showing that only the final letters are known to us.

It must be noted that for this phase of the project, in which we have not targeted to go deeply into onomastic analyses and details, the ethnicity of the name remains available only upon login and they have not been transferred to the open access database. From a linguistic point of view, the names recorded in the boxes are to be written in the Nominative case, no matter in which case it appears on the inscription. The Greek names are not to be transliterated into the Latin alphabet, as the intent is to render faithfully the evidence from the source of information.

After the onomastic section, the following is focused on the **Juridical status**, **Ethnic** and **Geographical origin** of the individual. As such, we have the box **Natione**, in which we can mention the nation of the individual if it appears on the monument explicitly

(e.g. *natione Thracus*), followed by the box **Ethnicity**, in which we mention the ethnicity if it appears on the monument (e.g. *Thracus*). To clarify matters, in this section we are referring to ethnical origins explicitly stated as such on the monument, not to the inferred ethnical and geographical provenience of the name which we mentioned above. Subsequently, we have a local citizenship box in which we can introduce details about the local juridical status of an individual. This box was very useful in the case of the Greek cities from Moesia Inferior, where some of the individuals might not have been Roman citizens (previous to AD 212) but had the local citizenship. In some cases, the holding of a local citizenship is expressly mentioned, as in the case of Ἑρμογένης, son of *ignotus* (ID 46) who was a citizen of Ancyra and Tomis, but in other cases the information is inferred. The juridical status can be inferred by at least three types of evidence: the individual might hold local magistracy, as Ἄτταλος, son of Εὐμένης (ID 3647), who was an *ἄρχων, ἀγορανόμος, and τάμιας* of the city, or the inscription might mention the *tribus* of the individual, as in the case of Ἀπατούριος, son of Εὐέλπιστος (ID 6520) who was part of the Φυλὴ Ὀπλητες. Nonetheless, these data get into the database only if they are un-doubtable.

The **Gender** drop-down menu allows to select among three options: female, male, and unknown. Since there are many fragmentary inscriptions which do not allow to render with certitude the gender of the individual, the unknown category is extremely important, and records (for the moment) 667 such cases.

Next, the user must deal with the **Juridical status** by ticking this category, which opens a series of boxes which must be ticked as well: **Citizen, Libertus/-a, Veteranus, Peregrine, Slave**. Among these, if ticked, the **Veteranus** box opens other options: from a drop-down menu one can select, if known, the **Veteranus unit** (legio V Macedonica, cohors I Vindelicorum, etc.) and the **Veteranus rank** (*centurio, beneficiarius*, etc.) of the individual.

Next the author has the possibility to select from a drop-down menu the name of the **Tribus** to which an individual was part of.

Then, follow the **Origo** and **Domus** fill-in boxes, which are to be filled in if the source mentions these types of information. Namely, *origo* stands for the place of provenience, which can be a province, an area or a city (Lugdunum, regione Laodicea, etc.) and *domus*, when recorded explicitly, indicates the town or community of provenience (Verona, Emona, etc.)

Next comes the **Collegium/ association** tick-box, which if ticked opens a series of fill-in boxes: **Type of association** (religious, professional), **Position** (*magister, agonothetes*, etc.) within the association and **Activities** within the association.

The **Religious position** check-box resembles the previous one and if checked opens a variety of possibilities. The author can choose from a drop-down list the **Sacerdotal office** of an individual (*antistes, augur, flamen, haruspex, pontifex*), or they can check the box **Coloniae/ municipii sacerdos, Military sacerdos, Imperial priest, Divinity priest, Laurentium Lavinatum**, each of which if checked open a details box for the author to add any supplementary information.

The **Occupation** check-box follows, which if checked opens a drop-down list with a multitude of encoded occupation titles (Varga, "Professionals" 9-22), which can be selected if appropriate (*negotiator, pedagogus*, etc.).

A **Deities** text box comes next, which is designed to comprehend the names of the divinities mentioned in the inscriptions (Iupiter Optimus Maximus, Junona, etc.).

Next is the **Age** textbox, in which the author records the number of years the individual lived for, in Roman numerals (L, IX, etc.). There where the age is unreadable due to the monument's state of conservation, the author must insert an interrogation mark (L[---]?, if the age is completely unreadable a question mark is to be inserted).

A **Details of life/ death** textbox follows and allows the author to insert a text with any relevant information (The inscription mentions the fact that he lived moderately, *negotians splendid – sic!*, etc.).

Then follows the **Dedicated for/ by** check-boxes which record whether an inscription was dedicated by the specific individual or for him. When an inscription was elevated by an individual both for him and for someone else, then in the personal data sheet of the respective individual both check-in boxes (dedicated for, dedicated by) will be checked. An illustration of this is the example of Titus Aurelius Narcissus (ID 18) who made a dedication to Iupiter Optimus Maximus and Iunona Regina for him and his family, or that of Marcus Ulpius Longinus (ID 6904) who dedicated, while alive, a funerary inscription to his wife Ulpia Aquilina (ID 6905), but also to himself.

In order for the personal data sheet to be connected to the encoded inscription, the author must fill in the search box with autocomplete or chose from a drop-down list the **Inscription code** he/she has attributed to the inscription which attests the individual whose data sheet is being recorded. Here multiple select is possible, in case of an individual attested without trace of a doubt by more inscriptions recorded in the database. The file cannot be saved without the inscription code being selected and thus the link made between the tables of the database.

Next follows an **Ordo senatorius** check-in box which if checked open two boxes, one which gives the author the possibility to record **Details** on the senator, and the other one which gives the possibility to record details on the **Cursus honorum**

(*curator viae Latinae, quaestor urbanus, tribunus plebis*, etc.). The Details field, here and for the following types of entries, is not compulsory to be filled in, it is only meant for the rare inscriptions which offer unstandardized (and impossibly to standardize) data on certain positions, occupations, realities in general. The **Ordo equester** check-in box follows and it is built on the same principles.

The check-in box **Provincial governor** is next, which if checked opens a box for **Details** (*legatus Augusti propraetore, praeses Moesiae Inferioris*, etc.), and two check-in boxes (**Praetorian rank, Consular rank**), one of which needs to be checked.

The **Procurators** check-in box follows, which if checked opens a procurator details box, and two check-in boxes (**Praesidial** and **financial procurator**).

The **Local magistrate** check-in box opens only a **Details** box, where the type and nature of the magistrature are to be filled in (president of the Assembly, *Ilvir coloniae*, etc.).

The **Decurion** check-in box opens a decurion **Details** box, as well as a drop-down list which allows to select the **City/ town** where the position was held, as well as a **Multiple decurionate** check-in box, which if checked opens itself a **Details** textbox, where the cities in which the multiple decurionate was carried on are to be recorded (*Sarmizegetusa & Apulum*, etc.).

The **Pontarch** check-in box opens a **Details** textbox (here additional information can be filled in, for example: *υἰός τῆς πόλεως*, twice, etc.).

The **Imperial slave** and the **Imperial freedman** check-in boxes each open a **Details** textbox (dating, where there is the case).

The **Military personnel** check-in box opens a wider variety of options: first there is a military personnel **Details** textbox, followed by **Military rank** (*decurio, vexillarius*, etc.) and **Military unit** drop-down lists, as well as a **Military career** (*tribuno legionis II Augustae, legato legionis X Fretensis; secunda militia*, etc.) textbox.

Following these a **Decorations** check-in box comes next, which opens a **Details** textbox (*hastis faleris, corona murali; donatus torquibus, armillis, phaleris bello Dacico*, etc.).

Lastly an **Observations** text area is available (a text area allows more than the 255 characters permitted by a text box) for the author to record any additional and useful information which has not been comprised in the above categories. Basically, this is the only category which is to include editorial comments, notes and other information that do not come directly from the source text, but are either deduced or historiographically known through the correlation of multiple sources. The **Observations** text area allows the author to use a higher number of characters than the textbox, which is limited.

In the cases where there are in the inscription words which were incorrectly written by the *lapicida*, following the incorrect word the authors introduce “*sic!*” in order to draw attention to the mistake. For example, the individual under the ID number 162, Flavius Constantius appears as a *custor templi*, not a *custos templi*, as such, (*sic!*) appears after the mentioning of *custor templi*.

Personal relations

The last step is to create a relational linkage between those individuals whom are related to one another from various perspectives. As such, the author opens the **Personal relations** tab, and next the **New relation between persons** button (Fig. 5). After this, the user will be able to select from a drop-down list the name of the individual (the ID number appears next to it in order to make the identification more easy and certain), next from another drop-down list the **Relation type** is selected, and lastly from another drop-down list the person to whom the individual is connected. For each individual the relation is reciprocated, more precisely, if we have an inscription which attests a family relation of son and father, father and son, the author will have to record both types of relationships, meaning that it will have to create two separate records. One of the records will register the status of father of the specific individual (named as person 1) to the other individual (person 2), while the second record will register the status of son of the specific individual (now person 1, but previously recorded as person 2) to the other individual (now person 2, but previously recorded as person 1).

In the **Observation** text area, one can write different notes concerning the relation between the individuals, or any relevant data (E.g.: ID 3063 'Ιουλία WifeOf ID 3064 Φιλίσκος. Text area: They were married for 38 years, and they had children; ID 3029 Aurelia Dusia MotherOf ID 3028 Aurelius Erculanus. Text area: She was his step mother; ID 3029 Aurelia Dusia WifeOf ID 3030 Seutes. Text area: She was his second wife). The text area is especially useful in those cases where there is an unspecified, or unreadable relationship type between the individuals, but the user may assume the type of relationship (E.g.: ID 1451 Σαραπίων Unspecified relationshipOf (M) ID 1478 Ἀριστόνεικος. Text area: Probably they were brothers).

The **Relationship types** drop-down list comprises all relationships encountered in epigraphy, both familial and non-familial. The relationship types have been encoded, each receiving a specific three-digit code (Varga, “New Developments” 13-14). The first digit is 1- for first degree relationships, 2- second degree ones and so on up to 4- work/neighbourhood relations and 5- unknown/unspecified relations. The third digit

stands for gender, as 1 is for male and 2 for female: e. g. 101 – Husband. The relationship types were designed to be as varied and encompassing as possible, this category being also further enriched when the authors came across a new type of relation in the inscriptions, through **Relation** table.

The screenshot displays the 'ROMANS ONE BY ONE' web interface. At the top, there are logos for the University of Babeş-Bolyai, the Centre de Studii Romane, Romans byl, Fritz Thyssen Stiftung, and Ue fisci. Below the logos is the title 'ROMANS ONE BY ONE' and a navigation bar with tabs: INSCRIPTIONS, INSCRIPTION BIBLIOGRAPHY, PERSONAL DATA, and PERSONAL RELATIONS. On the left, a vertical menu lists various categories: ETHNICITY, LANGUAGE, MATERIAL, CITY/TOWN, GENDER, SACERDOTAL FUNCTION, OCCUPATION, MILITARY UNIT, MILITARY RANK, POSITIONS, TRIBUS, INSCRIPTION TYPE, RELATIONS, PROVINCES, GENERAL BIBLIOGRAPHY, and USERS. The main content area is titled 'Editing Relation between persons' and contains a form with the following fields: Person 1 (19857 - Titus Aurelius Cassianus), Relation 1 (103 - FatherOf), Person 2 (19860 - Aurelius Cassianus), and Observations. There are 'Save' and 'Show | Back' buttons at the bottom of the form.

Fig. 5. New relation between persons file

Each record sheet can be later on edited or deleted by one of the users, action which is essential when working with a large data set.

Left-side panel

On the left side of the page, the account-based user can find the following tables: **Ethnicity**, **Language**, **Material**, **City/ Town**, **Gender**, **Sacerdotal function**, **Occupation**, **Military unit**, **Military rank**, **Positions**, **Tribus**, **Inscription type**, **Relations**, **Provinces**, and **General bibliography**. If individually clicked, all these tabs give the possibility to record new specific data, but editing them is possible only if one has an

administrator account. For example, in case one of the authors comes across an inscription in Greek and the language cannot be found in the drop-down list, in order for him/ her to be able to select the language from the drop-down list, when creating a **New inscription record**, he/ she needs to first go to the left side of the panel, to the **Language tab**, press the **New language record** button and insert the language in the textbox and save the record. Similarly, if one of the authors comes across a new military unit which has not been attested in the previous inscriptions, an admin needs to go to the left side of the panel, to the **Military unit tab**, press the **New unit record** and introduce the name of the unit in the textbox, and save the record. By creating this new entry, the author will be able to select this information from a drop-down list on the “new person” field, connecting the unit to the name and the other identification details of an individual. Once the record is created for language it can be used every time the language appears in the new Inscriptions. The same rule applies for military unit, and all the other categories.

What is important is the fact that any new introduced data represents a new criterion of research. As such, in the case of a military unit, for example, one can do a prosopographical research which will provide all of the epigraphically attested individuals whom were part of a specific unit.

The open access database has six main tabs, some of which open sub-tabs, as follows:

Home

The home tab offers a brief synthesis on the database, as well as on the terms of use, and on the ways the user may offer their feedback.

Team

The team tab briefly presents the five researchers who worked in the building of the database, with further links to their CVs, lists of publications, and Academia webpage.

About

Projects

The project sub-tab offers information regarding the projects which helped and led to the development of the database.

Conferences

The conferences sub-tab directs the user to details regarding the conferences organised as part of the Romans1by1 projects.

Educational Initiatives

The educational initiatives sub-tab provides information on workshops, seminars, etc.

Contact

Next, the contact sub-tab, offers the opportunity to the users to contact the database administrator.

People

The two most important tabs are the fourth and the fifth ones, which allow the user to browse, research and filter the data, as well as download it (Excel download). The existing search filters for this tab are prosopographically oriented, as such we have the possibility to search the name of an individual, the province and/ or place of origin, the corresponding bibliography, but we can also make a general search based on key words. This table offers the possibility of simple searches, based on Name, Province, Place, Bibliography and a text-based General search (Fig. 6; Fig. 7; Fig. 8).

The screenshot shows the website interface for 'ROMANS ONE BY ONE'. It features a navigation menu with 'HOME', 'TEAM', 'ABOUT', 'PEOPLE', 'ADVANCED SEARCH', and 'REFERENCES'. Below the menu is a descriptive paragraph about the database and a 'Search Filters' section with input fields for Name, Province, Place, Bibliography, and a General Search field. A 'Search' button and a 'Clear Filters' link are also present. The main content is a table with the following columns: Details, Code, Praenomen, Nomen, Cognomen/Personal name, Father/Master name, Natione, Ethnicity, Gender, Citizen, Libertus/a, Veteranus, Peregrine, Slave, Veteranus unit, Veteranus rank, Tribus, Origo, Domus inscription code, and Province. The table lists 47 individuals, including Aelius Iulianus, Aelius Pionius, Valerius Maximus, Titus Aurelius Narcissus, and others, with their respective details and origins.

Details	Code	Praenomen	Nomen	Cognomen/Personal name	Father/Master name	Natione	Ethnicity	Gender	Citizen	Libertus/a	Veteranus	Peregrine	Slave	Veteranus unit	Veteranus rank	Tribus	Origo	Domus inscription code	Province
Show 11		Aelius	Iulianus					Male	true	false	false	false	false					00001D	Dacia
Show 12		Italia	Priscilla					Female	true	false	false	false	false					00001D	Dacia
Show 13		Aelius	Iulianus					Male	true	false	false	false	false					00001D	Dacia
Show 14		Aelius	Pionius					Male	false	true	false	false	false					00001D	Dacia
Show 17		Calus	Valerius	Maximus					true	false	false	false	false					00003D	Dacia
Show 18		Titus	Aurelius	Narcissus					true	false	false	false	false					00004D	Dacia
Show 19		Aurelius	Alexander				Surus	Male	true	false	false	false	false					00005D	Dacia
Show 21		Iulius	Iulio					Male	true	false	false	false	false					00001M	Moesia Inferior
Show 22		Iulius	[--]						true	false	false	false	false					00001M	Moesia Inferior
Show 26		[--]					Ζηροκλέος	Male	false	false	false	true	false				Προποντινός, όμοι (Υρσιού)	00004M	Moesia Inferior
Show 27			Μηρόδωρος				Γάιος	Male	false	false	false	true	false				Προποντινός, όμοι Υρσιού	00005M	Moesia Inferior
Show 28		[--]	Ιππός				Σίππων	Male	false	false	false	true	false				Αλωανδία	00006M	Moesia Inferior
Show 29			Ακός[--]					Male	false	false	false	true	false					00007M	Moesia Inferior
Show 30		Aurelius	Ernes					Male	true	false	false	false	false					00001P	Pannonia Inferior
Show 32		Aurelius	Barbutus					Male	true	false	false	false	false					00002P	Pannonia Inferior
Show 33								Male	false	false	false	false	false					00001S	Moesia Superior
Show 37		Iulius	Sentis					Male	true	false	false	false	false					00003P	Pannonia Superior
Show 38		Aurelius	Martialis					Male	true	false	false	false	false					00004P	Pannonia Superior
Show 39		Valens	Licinia					Female	true	false	false	false	false					00004P	Pannonia Superior
Show 40			Πουαβδίη				Τάσιος	Female	false	false	false	true	false					00005M	Moesia Inferior
Show 41			Ολοκρίτος				Ολοκρίτος	Male	false	false	false	true	false					00006M	Moesia Inferior
Show 43			Επιγεβίος					Female	false	false	false	true	false				Ηελλάδα	00010M	Moesia Inferior
Show 44			Ιούχι					Male	false	false	false	true	false				Ηετρωσία	00010M	Moesia Inferior
Show 45			Επαιγίτης					Male	false	false	false	true	false				Κίνοπος, Αλεγρία	00010M	Moesia Inferior
Show 46								Male	false	false	false	true	false					00010M	Moesia Inferior
Show 47		Titus	Domitius					Male	true	false	false	false	false					00005P	Pannonia Superior

Fig. 6. Interface of the open access version

The screenshot shows the website interface for 'ROMANS ONE BY ONE'. The browser address bar displays 'romans1by1.com/rinscriptions/277'. The navigation menu includes HOME, TEAM, ABOUT, PEOPLE, ADVANCED SEARCH, and REFERENCES. The main content area is titled 'Details of inscription 00016DAL' and is divided into two columns. The left column contains the following information: Inscription code: 00016DAL; Type of inscription: Funerary; Language: Latin; Atypical features: written: DD MM; Province: Dalmatia; Place of discovery: Solin; Place of provenience: Salona; Ancient name provenience: [Salona](#); Timestamp/Timeframe: 201-270 AD; External links: http://edh-www.adw.uni-heidelberg.de/inschrift/suche?hd_nr=HD058504&land=&fo_antik=&fo_modern=&literatur=&dat_jahr_a=&dat_jahr_e=&. The right column is titled 'Bibliography:' and contains a table with the following data:

Abbreviation	Author and Title	Page	Comments
CIL	Corpus Inscriptionum Latinarum	2086	

A 'Back' link is located at the bottom left of the details section.

Fig. 7. Example of inscription file (open access)

The screenshot shows the website interface for 'ROMANS ONE BY ONE'. The browser address bar displays 'romans1by1.com/people/1185'. The navigation menu includes HOME, TEAM, ABOUT, PEOPLE, ADVANCED SEARCH, and REFERENCES. The main content area is titled 'Details of person' and is divided into four columns. The first column contains: ID: 1185; Cognomen/Personal name: Herculanius. The second column contains: Gender: Male; Juridical status: yes; Slave: yes; Occupation title: adiutor tabularii; Dedicated by: yes. The third column contains: Inscriptions: 00251DS 00258DS; External Link: <http://edh-www.adw.uni-heidelberg.de/edh/inschrift/HD047408&lang=en>; <http://edh-www.adw.uni-heidelberg.de/edh/inschrift/HD019513>; Imperial slave: true; Imperial slave details: verna. The fourth column is titled 'Relations' and contains a table with the following data:

Relation Type	Related person
HusbandOf	1185 Aurelia Respecta
HusbandOf	1198 Claudia Turpilia
FatherOf	1199 Carus

A 'Back' link is located at the bottom left of the details section.

Fig. 8. Example of person file (open access)

Advanced Search

The advanced search is an extended version of the previous one, this one including a large variety of research filters which allow the user to select specific ones (Fig. 9). As all the databases which are built on research filters, the usefulness of it is given by the fact that it offers to the user a greater precision and swiftness in retrieving

the needed information. Moreover, various prosopographical filters can be combined, which gives a great flexibility to the user who, based on the specific interest he/ she has at a certain moment, can narrow down the information and the sources. The existing research filters match with the data categories presented in the personal data sheet paragraph.

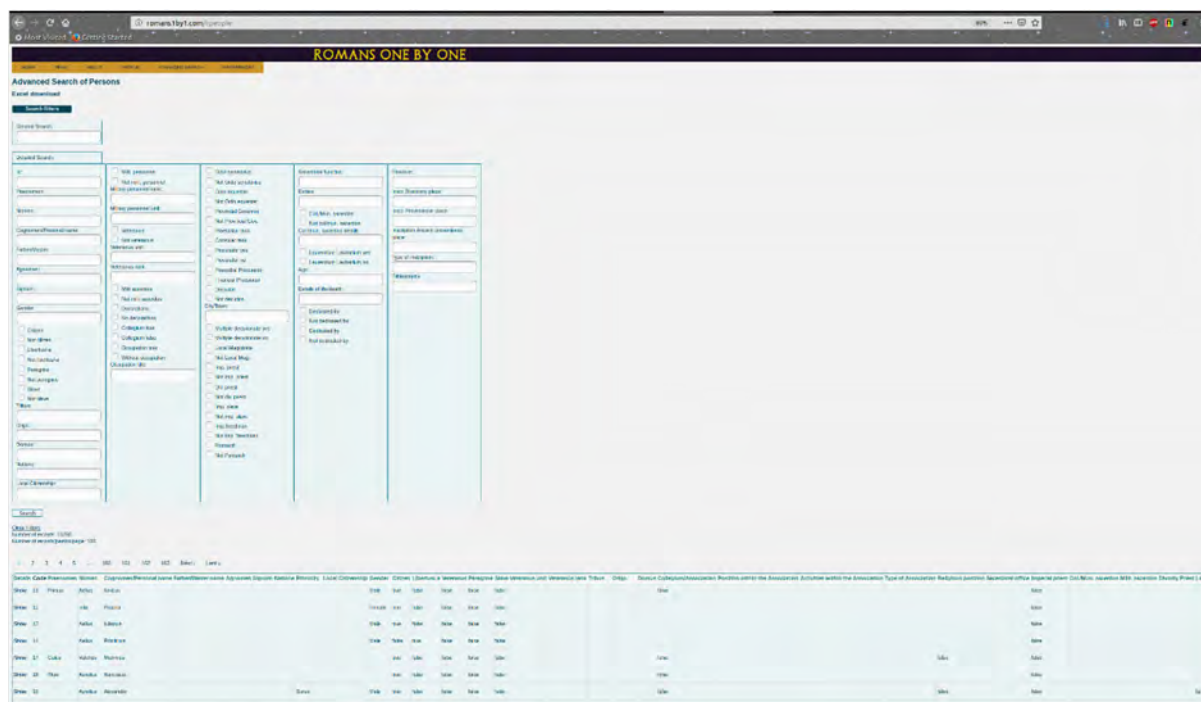


Fig. 9. Advanced menu on the open access website

References

Abbreviations and Bibliography

In the abbreviations and bibliography tab, the user can retrieve the corresponding abbreviations of the bibliographical works we used (Fig. 10). The abbreviations follow mostly the principles of the *Année Philologique*. In this section one can also make a search based on a specific abbreviation, or on a title of a publication.

Database Documentation

This section comprises a link to the publications which document various aspects related to the database, from the applied methodology, to its architecture, and to its overall informational content and contribution. Besides the publications, one can

also find links to the presentations given by some of the team members regarding the database at various events.

Scientific Publications

The last sub-tab encompasses a list of publications which examine specific prosopographic or demographic aspects, the primary data on which the topic was built being downloaded from the database.

The screenshot shows the website interface for 'ROMANS ONE BY ONE'. The main navigation bar includes links for HOME, TEAM, ABOUT, PEOPLE, ADVANCED SEARCH, and REFERENCES. The current page is titled 'Abbreviations and bibliography' and features a search form with fields for 'Abbreviation' and 'Title', and a 'Search' button. Below the search form, there is a pagination control showing '2' and 'Next' and 'Last' buttons. The main content is a table with two columns: 'Abbreviation' and 'Complete title'. The table lists various publications, including works by Szabó, Boda, Bunoiu, Timoc (2016), AE, AIJ, ArchÉrt, Avram (2007, 2014, 2014b, 2015, 2015b), Avram, Bărbulescu (1992), Avram, Chera, Lungu (2016), Avram, Ciantă, Lungu (2016), Bărbulescu (1972, 1977, 2012), Bărbulescu, Buzoianu (2009, 2010, 2014a, 2014b), and Bărbulescu, Buzoianu, Băjenaru (2014).

Abbreviation	Complete title
Szabó, Boda, Bunoiu, Timoc 2016	Cs. Szabó, I. Boda, V. Bunoiu, C. Timoc, Notes on a new Mittraic inscription from Dacia. In: <i>Mensa rotunda epigraphica Napocensis, Cluj-Napoca</i> , 2016, p. 91-104 <i>Année Epigraphique</i> , Paris
AE	
AIJ	V. Hoffliker, B. Saria, <i>Antike Inschriften aus Jugoslawien</i> , Zagreb, 1938.
ArchÉrt	<i>Archaeologiai Értesítő</i>
Avram 2007	Al. Avram, <i>Le corpus des inscriptions d'Istros revisité</i> , <i>Dacia</i> 51, 2007, p. 79-132.
Avram 2014	Al. Avram, <i>Inscriptions d'Istros</i> . In: <i>Dacia N.S.</i> , LVIII, 2014, p. 271-285
Avram 2014b	Alexandru Avram, Die 'Freiheit' von Tomis in der Kaiserzeit. In: V. Cojocaru, Ch. Schuler (eds.), <i>Die Außenbeziehungen pontischer und kleinasiatischer Städte in hellenistischer und römischer Zeit</i> , Al. Avram, <i>Newly Published Documents Concerning Cult Associations in the Black Sea: Some Remarks</i> . In: Vincent Gabrielsen, Christian A. Thomsen (ed.), <i>Private Associations and Alexandru Avram, Un tribun de la Legio XIII Gemina dans une inscription tomitaine presque oubliée</i> . In: <i>EN</i> , XXV, 2015, 185-188.
Avram 2015	
Avram 2015b	
Avram, Bărbulescu 1992	A. Avram, M. Bărbulescu, <i>Inscripții inedite de la Callatis aflate în colecțiile Muzeului de istorie Națională și Arheologie din Constanța</i> . In: <i>Pontica</i> , 25, 1992, 167-205.
Avram, Chera, Lungu 2016	Al. Avram, Constantin Chera, Virgil Lungu, <i>Deux inscriptions céramiques de Tomis</i> . In: M. Slavova, N. Sharankov(eds.), <i>Studia Classica Serdicensia</i> , Volume 5, 2016, 27-32, n. 1.
Avram, Ciantă, Lungu 2016	A. Avram, T. Ciantă, V. Lungu, <i>Neue Inschriften aus Tomis</i> . In: <i>ZPE</i> , 197, 2016, 140-148.
Bărbulescu 1972	M. Bărbulescu, <i>Der Diana Kult in römischen Dakien</i> . In: <i>Dacia SN</i> , 16, 1972, p. 203-223.
Bărbulescu 1977	M. Bărbulescu, <i>Cultura lui Hercule în Dacia romană (I)</i> . In: <i>Acta Musei Napocensis</i> , 14, 1979, p. 173-194.
Bărbulescu 2012	M. Bărbulescu, <i>Inscripțiile din castrul legionar de la Potaissa</i> , București, 2012.
Bărbulescu, Buzoianu 2009	M. Bărbulescu, L. Buzoianu, <i>Inscriptions inédites et revues de la collection du Musée d'Histoire Nationale et d'Archéologie de Constanța</i> . In: <i>Pontica</i> , 42, 2009, p. 389-407.
Bărbulescu, Buzoianu 2010	M. Bărbulescu, L. Buzoianu, <i>Inscriptions inédites et revues de la collection du Musée d'Histoire Nationale et d'Archéologie de Constanța</i> . II. In: <i>Pontica</i> , 43, 2010, p. 347-376.
Bărbulescu, Buzoianu 2014a	M. Bărbulescu, L. Buzoianu, <i>L'espace ouest-pontique sous l'empereur Tibère à la lumière d'un décret inédit découvert en Dobroudja</i> . In: V. Cojocaru, A. Coskun, M. Dana (eds.),
Bărbulescu, Buzoianu 2014b	M. Bărbulescu, L. Buzoianu, <i>Éducation, culture et religion à la lumière de deux inscriptions inédites de Tomis et de son territoire</i> . In: V. Cojocaru, Ch. Schuler (eds.), <i>Die Außenbeziehungen</i>
Bărbulescu, Buzoianu, Băjenaru 2014	M. Bărbulescu, L. Buzoianu, <i>Inscripții inedite din Tomis și din împrejurimi aflate în colecția Muzeului de istorie Națională și</i>

Fig. 10. Bibliography list on the open access website

Differences between the two platforms

The differences between the two platforms consist in the changes and data input which can be done in the first one, in comparison with the second, as well as in the pure exploratory and browsing character of the second.

The database is dedicated not only to the specialists in the field whom use it for research purposes, but also to the wider public, be it individuals passionate about ancient history, or school teachers who can use the database as a pedagogic tool. Certainly, from an external point of view, the advantage of the database is the fact that it is in English, which ensures a wider access to it.

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Works Cited

- Becker, Sascha O., Francesco Cinnirella, Erik Hornung, Ludger Woessmann. "iPEHD – The ifo Prussian Economic History Database." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, vol. 47, no. 2, 2014, pp. 57-66.
- Carrion, Daniela, Federica Migliaccio, Guido Minini, Cynthia Zambrano. "From Historical Documents to GIS: A Spatial Database for Medieval Fiscal Data in Southern Italy." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, vol. 49, no. 1, 2016, pp. 1-10.
- Cook, Lisa D. "Converging to a National Lynching Database. Recent Developments and the Way Forward." *Database Developments. Historical Methods*, vol. 45, no. 2, 2012, pp. 55-63.
- Dormans, Stefan, and Jan Kok. "An Alternative Approach to Large Historical Databases." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, vol. 43, no. 3, 2010, pp. 97-107.
- Hedefalk, Finn, Lars Harrie, and Patrick Svensson. "Methods to Create a Longitudinal Integrated Demographic and Geographic Database on the Micro-Level." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, vol. 48, no. 3, 2015, pp. 153-173.

- Huistra, Hieke, and Bram Mellink. "Phrasing History: Selecting Sources in Digital Repositories." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, vol. 49, no. 4, 2016, pp. 220-229.
- Kennedy, Gregory and Kris Inwood. "A New Prosopography. The Enumerators of the 1891 Census in Ontario." *Database Developments. Historical Methods*, vol. 45, no. 2, 2012, pp. 65-77.
- Mandemakers, Kees and Lisa Dillon, "Best Practices with Large Database on Historical Populations." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, vol. 37, no. 1, 2004, pp. 34-38.
- Massey, Catherine G. "Playing with Matches: An Assessment of Accuracy in Linked Historical Data." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, 2017, pp. 1-15.
- Murmann, Johann Peter. "Constructing Relational Databases to Study Life Histories on Your PC or Mac." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, vol. 43, no. 3, 2010, pp. 109-123.
- Noble, Petra, David Van Riper, Steven Ruggles, Jonathan Schroeder and Monty Hindman. "Harmonizing Disparate Data Across Time and Place: The Integrated Spatio-Temporal Aggregate Data Series." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, vol. 44, no. 2, 2011, pp. 79-85.
- Varga, Rada. "Romans 1 by 1 v. 1.1. New Developments in the Study of Roman Population." *Digital Classics Online*, vol. 3, no. 2, 2017, pp. 44-59.
- Varga, Rada. "Romans 1 by 1. Documenting a Population Database for the Roman World." *Digital and Traditional Epigraphy in Context. Proceedings of the EAGLE 2016 International Conference*, edited by S. Orlandi, R. Santucci, F. Mambrini, P.M. Liuzzo, Sapienza Università Editrice, 2017, pp. 333-341.
- Varga, Rada, "The Professionals of the Latin West." *Social Interaction and Status Markers in the Roman World*, edited by R. Varga, G. Cupcea, Archaeopress, 2018, pp. 9-22.
- Varga, Rada, Annamária-I. Pázsint, Imola Boda, and Dan Deac. "Romans 1 by 1: Overview of a Research Project." *Digital Classics Online*, vol. 4, no. 2, 2018, pp. 37-63.
- Varga, Rada, and Angela Lumezeanu. "The Process of Record Linkage on Roman Epigraphical Sources." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, 2019, in print.

Building life courses and explaining life choices with the help of digital prosopography

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Abstract: Digital tools have enhanced the possibilities of historical prosopographic researches, bringing to light facts and connections unnoticed before. Showcasing two very different databases – in structure, timeframe and employed sources – we will try to highlight how structured data can prove useful and revealing for the prosopography of the people living in all historical periods and areas. In order to make our point, we will first present the two databases from architectural and technical points of view, then we will focus on case studies extracted from each of them. The aim is to highlight the gain in historical knowledge brought forth by the employment of digital tools and technologies and how these means actually increase our insightfulness when facing the sources.

Keywords: historical databases, digital prosopography, life courses, biography, structured data

Digital methods of investigation have opened new perspectives and options in historical research. As methods become methodologies and tools evolve into being designed exclusively and purposefully for humanistic researches, historians have found the possibility to open new doors to the past and make their investigations more insightful, based on an unprecedented exhaustiveness in the use of sources.

In her 2000 article from *History and Computing*, dr. Katharine Keats-Rohan, maybe the most important “re-founder” of historical prosopography, stated that prosopography *is about what the analysis of the **sum of data** about **many individuals** can tell us about **the different types of connection** between them, and hence about **how they operated***

within and upon the institutions—social, political, legal, economic, intellectual—of their time. It is hard to imagine a better-adjusted definition, comprising all the complexity and interconnectivity implied by this type of researches. One may easily notice the use of terms emphasizing the quantitative dimension of prosopographic research (*sum of data, many individuals*), projected as steppingstones towards qualitative aims (to be able to differentiate and compare *types of connections*) in order to understand their functionality (i.e. *how they operated*) within a given historical society (period of time & geographic area). Indeed, this is what we are trying to do by constantly building larger and more complex prosopographic databases: ingest information from a plethora of sources, some of them not digitized yet, clean it, ensure a good data linkage and then wait for otherwise harder or impossible to spot connections to be brought to light and enter the scope of our analyses. From this point on the digital gradually fades, replaced by more traditional historical approaches meant to help understand and explain the past.

R1by1 & HDG

In order to better highlight this process of translation from digitally organized historical data to improvements in historical knowledge by means of digital prosopography, we have opted for showcasing three case studies, covering completely different historical periods, but dealing with the same issue: reconstructing life courses and life choices based on information spread across multiple sources. They were developed within the framework of two very different projects, both employing a prosopographical approach and making use of its own custom-built database, fitted to the particularities of the historical frame they are focusing on. But before presenting the results, we will briefly present the concept and architecture of each database, in order to familiarize the reader with our working tools.

Romans 1by1 (<http://romans1by1.com/>, henceforth R1by1) is a population database for the individuals epigraphically attested in classical Antiquity (we are mainly focusing on the Roman Latin provinces, but we also have datasets from Greek Classical and Hellenistic era colonies from the Black Sea area). No doubt, one of the most important advantages, in this case, is the creation of a prosopographical *corpus* which can be freely used for scientific purposes by anyone interested in the field, as well as for educational purposes, or for disseminating aspects related to ancient history to a wider sector of the public, in an accessible and friendly manner. Another advantage is given by the fact that the database was built in order to be very user friendly and adaptable to the research question one has: more precisely we speak of the search filters in each main category which allow the user to request a specific set of information

from the database. In this manner, at a click distance, we can find, for example, who all members of private associations were, or who the attested governors of the provinces were. Moreover, all the information of our choice can be easily downloaded in a .xls file and scientifically processed later on.



Fig. 1. Romans1by1 website

The database has been documented before (Varga, “Documenting”; Varga, “New Developments”; Varga *et al.* “Overview”; Varga *et al.* “Guidebook”), thus we will only schematically present its architecture and the metadata (Fig. 1). Romans 1by1 is a relational database, built in MySQL and following the best practice models for population databases (Mandemakers and Dillon). The metadata is structured into four major tables (*Inscriptions*, *Bibliography*, *Personal Data* and *Personal relationships* – summing up to more than 100 separate attributes) (Varga, “New Developments” 45). The first table to be filled in is the file of the source – *Inscriptions*; each inscription gets an identification code, formed of five digits and an acronym of the province’s name. In this section, certain fields are linked to other existing resources, in order to obtain maximum efficiency for the users. In *Bibliography*, a normalization table includes all bibliographical titles referred to and being quoted; with the help of a value list, one can choose one *Bibliography abbreviation* for which the full reference, detailed information and comments are then displayed. Of course, all data are linked to the *Inscription code*, selected as well from a value list. The core of the database is a table used for recording data about individual persons (labeled *Personal data*), around which the entire network of relations is built. Each new entry represents a singular epigraphic attestation of an individual, and a unique

ID is generated, which will help link the character within the various components of the database and with other database entries. The person is also manually linked to the source using a value list of the inscriptions` codes. In the case of one person being attested by multiple epigraphic sources, each attestation will be represented by a new entry, to which a new unique ID will be assigned and which will be doubled during linkage procedures by a common ID for all instances of the same person. Expectedly, this metadata is the most volatile one, being in a continuous process of modification and enlargement. As a principle, we are trying to remain faithful to the source and to record during the first phase only the minimum of deduced information. Based on the personal ID given to each individual, the *Relationship* table will solely name the relationship between individuals (A to B and B to A) (Varga, “New Developments” 50), choosing from a drop-down menu.

Very important for us was the search interface of the database. Built with Ruby-on-rails, it was designed to respond to the most manifold and complex search options. Every component of the database has search filters for every particular field, as well as a general search.

Historical Data Grinder (<http://hdgrinder.ro>, henceforth HDG)¹ is a database currently hosting information about late 19th century middle classes in Transylvania (by then a part of the Kingdom of Hungary, the eastern half of the Habsburg monarchy), but whose concept was developed having in view a broader aim: to fit an extended range of historical data by employing a modified Entity – Attribute – Value (EAV) architecture. HDG works primarily as a data set aggregator, requiring information to be pre-organized according to its structure, but also allows for continuous addition of piecemeal information or relationships between existing entities directly into the database, through its interface. It was created having in mind the low or medium at best degree of digital literacy of many historians and history students, thus it can easily fit in large datasets imported from common spreadsheet (the widest used method of storing serial data among scholars in humanities), as well as single facts provided by unique sources. It is also designed to accommodate and allow the relationship of information from datasets of extreme diversity created by different authors and covering distinct segments of historical reality, not just 19th century Transylvania from where the research started. In principle, the model can be borrowed for and applied to any type of historical research, regardless of time frame, geography, or thematic approach (Fig. 2).

¹ The concept was developed by Angela Lumezeanu and Vlad Popovici. A.L. was in charge of building the database and all associated technical requirements, while V.P. dealt with providing the historical information. The database is part of A.L.’s doctoral project on historical databases in Romania and is currently in testing. An extended description of it will be published soon.



Fig. 2. HDG website

The basic principle behind HDG is that any historical information, from virtually any source, can be grinded down to three basic elements: Entities, Values, and Attributes – the latter including both categories that help order entities and values, as well as a large variety of relations between the aforementioned two. Entities may be: beings (human or animals, real or imaginary), premises and geographical or administrative units, objects or machines, and generally any physical body whose characteristics or activity is recordable, measurable or can be ordered. Values are characteristics of entities, their specificities. A value may be the same for a virtually infinite number of entities (e.g. given height or weight, occupational title, pathological aspects, given area of an administrative unit, technical specs of a machine, etc.). Attributes are general categories that group large sets of values, thus defining the relation between an entity and a value (e.g. “profession” links a person to an occupational title) or as a second possibility they can define the relation between two entities (e.g. “kinship” links two persons; “residence” or “birthplace” link a person to a place).

Following this principle, any given historical information, regardless the form it reaches us can be integrated into an extremely simple and flexible structure of variables. One just needs to carefully assign which type of data goes to which category, namely to properly define what is an entity and what is a value and what type of attribute or relation is associated with them. Timestamps are added to this structure, to help pinpoint the moments in which attributes are being registered, together with information on the sources. The grinded elements can be subjected to analyses or linked to other sources, while the original information from a single source can be at any time recreated with a single command line.

Roman life courses and expression choices

The first example is that of an ancient familial and social network, resulted from the conjoining of three Latin inscriptions, well known from the 19th century, but never connected properly, as patterns are not always visible for the naked eye (Varga “Aquila”). Thus, we have a local magistrate (*decurio*) of a rural settlement and merchant from Potaissa, in northern Dacia, Aurelius Aquila (Fig. 3), who lived during the 2nd C AD and moved at some point of his life to the Dalmatian coast, in Salona (modern day Solin, Croatia); here – and most probably before relocating as well – he worked as a merchant (*negotiator*). The source we are dealing with is an epitaph, as in Salona he buries his wife, dead after 7 years of marriage without a single quarrel, in a relatively lavish sarcophagus, now lost (It was later published by Th. Mommsen as CIL III 2086). The monument was described by D. Bertolini, Italian archaeologist who, among others, coordinated the excavations from Concordia. In 1885, he saw the monument inside a shop in Venice and described it, but unfortunately it was subsequently lost/destroyed. Nonetheless, Bertolini said that the inscription was part of the 2,25 x 0,65 meters front of a sarcophagus; the area was divided in five registers and the inscription placed centrally. On the sides, there are representations of a Genius and of Mercurius. The author says the reliefs were rudely executed and the monument was generally deteriorated from exposure. The name of Aquila’s wife was Valeria Ursina and she was the daughter of Titus, as the inscription states. Another monument (CIL III 2006, curated in the epigraphical collection of the Archaeological Museum of Split), coming from the same city, has the partially damaged name of a father – identified by us with Aurelius Aquila – who dedicates for the memory of his son, Titus Aurelius, a soldier in Pannonia, dead at 33 years old. The soldier bears the second name of Aquila’s father-in-law from the sarcophagus, bringing the connection, as well as his maternal lineage, to light. Even if the *decurio* had in mind to be buried along his wife, he lived for many years on, if we are to consider the second monument. Nonetheless, Apollonius was 33 years old at the time of his death, thus indicating a large interval between the erection of the two monuments – as Aquila and Ursina had been married for seven years, the child must have been very young at the time of his mother’s death. This detail makes the lack of a palaeographical comparison less important, as there is a strong chance to deal with different carvers/carving workshops.

But more than this family reconstruction, on the second stone we also have the names of two of Aquila’s friends and fellow merchants – thus giving one more relevant clue for the identity of the character. One of them, a Syrian of origin, Aurelius Flavus (Fig. 3), was further on identified on a religious dedication to an Oriental local god from central Dacia. Besides the linkage, the case also brings forth a clear example of disambiguation:

Flavus bears a name resemblance with another character from northern Dacia, a member of a local elite family from the mid 3rd C AD, with whom he had sometimes been speculatively linked. Now, by linking the two attestations in which his whole title coincides (name + *negotians Surus*), as well as the circumstances and chronology of his life, we can clearly state that we are dealing with two different characters.

The screenshot shows a web browser window with the URL romans1by1.com/rpeople/505. The page title is "ROMANS ONE BY ONE". Below the navigation menu, the "Details of person" section is displayed in a grid format:

Details of person			
<p>ID: 505</p> <p>Nomen: Aurelius</p> <p>Cognomen/Personal name: Aquila</p>	<p>Juridical status: yes</p> <p>Citizen: yes</p> <p>Origo: ex provincia Dacia</p> <p>Occupation title: negotians</p> <p>Dedicated for: yes</p> <p>Dedicated by: yes</p>	<p>Inscriptions: Q0016DAL, Q0014DAL</p> <p>External Link: http://edh-www.adw.uni-heidelberg.de/inschrift/suche?hd_nr=HD058504&land=&fo_antik=&fo_modern=&literatur=&dat_jahr_a=&dat_jahr_e=&hist_periode=&atext1=&bool=AND&atext2=&sort=hd_nr&anzahl=20</p> <p>Decurion: true</p> <p>City/Town: Potissa</p>	<p>Relations</p> <p>Relation Type Related person</p> <p>HusbandOf 504 Valeria Ursina</p> <p>AmicusOf 502 Aurelius Lucianus</p> <p>AmicusOf 501 Aurelius Flavus</p> <p>FatherOf 499 Titus Aurelius Apollonius</p>

Fig. 3. Personal file in Romans 1by1

This small-scale prosopographical reconstruction offers details on the great mobility of traders in the Roman Empire, as well as on how strong and time-enduring business connections could be. By linking the two sources, we gained insight not only into a man's group of work associates and friends, but on commercial and economical routes, on first-hand diffusion of goods and ideas in the ancient world. Generalizing, we can observe patterns of medium/long distance trade, in an age where communications were relatively low and scarce: in the absence of personal identification papers and the possibility of real control, we can assume that impersonal medium/long distance trade was virtually inexistent and personal connections and endorsements were crucial for traders' safety and success. These results were obtained through linkage and disambiguation due to the possibility to query and match all types of biographical data in Romans1by1.

The second case study from Romans1by1 doesn't concern a single person or family, but a professional group—health workers—and a very specific, dual type of epigraphic manifestation: one person explicitly exhibiting profession and origin mark on the same monument. More specifically, out of about 700 independent professionals registered in the Western provinces, a minority (around 100) also lists on their monuments provenience/

appurtenance details, such as ethnicity, *origo*, *domus*, etc. Our attempt was to reveal the reasons behind this double identification, the connections with the profession in the case of physicians and the socio-psychological background leading to these particular forms of expression.

Table 1. The health workers registering geographical origins on epigraphs

R1by1 ID	Name	<i>Origo/domus</i>	Profession	Bibliography
2315	Maximinus Festus	Arelate	<i>pausarius</i>	CIL XII 734
259	Marcus Octavius Aper	Nicomedia	<i>Medicus</i>	AE 1935, 70
202	Marcus Rubrius Zosimus	Ostia	<i>medicus</i>	CIL XIII 6621
176	Caius Iulius Filetonius	Africa	<i>medicus</i>	Tit.Aq. II 656
251	Sextus Pompeius Carpus	Antiochia Syriae	<i>medicus</i>	Tit.Aq. II 684
389	Διοκλής	Cyzicus	<i>ιατρός</i>	ISM I 26
248	Aelius Munatius	Samosata	<i>capsarius</i>	AE 1906, 110

How does it feel to be the only keeper of important knowledge, of life and death knowledge, from your entourages? Does it feel lonely, is it disconnecting? Today, due to all the information means available, we all hold some basic medical knowledge, we know how the inside of a human body looks like and we more or less understand pathologies and organs functionalities. In the ancient world, the situation was different, a doctor was the only person who had ever seen a dissected body, the only one who had to understand diseases and had to see their various effects. It is fair and justifiable to believe that this created a sense of remoteness, but it might come as a surprise to find out that a certain detachment comes forth, even from the medical personnel epigraphs. Whereas for traders and merchants it all seems to be about connections and people, most of the doctors appear unattached in epigraphs, alone or commemorated by first degree blood relatives. Under these circumstances, it comes as no surprise that few doctors and associated health workers (seven out of 102) write about their origins. But in the few cases when they do, we get places as: Nicomedia, Antiochia Syriae, Cyzicus, Samosata, which are locations of famous medical schools, old and renowned, basically endorsing one's healthcare skills. This is often the only "personal" detail which these inscriptions provide – and it proves it is not personal in fact, but rather a claim of professional legitimacy and competence through belonging. Thus, we have discovered a

rather surprising consistency with the groups' main epigraphic habit, which would have been mistaken for something else (place of origin) and hard to notice without having the information available in the structured form of a database.

An ordinary bourgeois life course

Getting closer to our days, the third case study involves a 19th century character: Leontin Simonescu. Despite being a well-regarded member of the Romanian bourgeoisie in Transylvania, highly active in the civil society of the time and former MP in the Hungarian House of Representatives, his biography stirred little interest among Romanian historians. The reasons lie partly in his political career, which took place within the ranks of the Liberal Party (LP) – the government party at the time in Hungary, and the main political adversary of the nationalist Romanian National Party (RNP). Being labelled as “outcast” (the byname for Romanian politicians supporting the Hungarian government before 1918) however, earned him a place in the first, recently published, prosopographical work dedicated to this particular group of several dozen MPs (Iudean 215-218).

No personal archive, no memoirs and not a single piece of correspondence by our case study's subject survived. Its three pages-long biographical medallion was written from bits and pieces of information scattered through the press of the time and secondary sources and roughly covers the main aspects of his life and activity. In its creation, the author employed a classical narrative biographical approach. Due to objective limitations of the research (i.e. the high number of research subjects, the discrepancies between them in previous historical interest and the diversity of the sources – mostly not digitized) information scattered in various other sources of the time remained hidden until HDG reunited and linked data from the biographical sketch with serial information regarding the membership and activity of various Romanian institutions from Transylvania in late 19th and early 20th centuries. In what follows we will be reviewing Simonescu's biography, as projected through the lenses of HDG, with the aim of highlighting the benefits of linking serial data with an already existing biographical sketch.

Leontin Simonescu was born in 1840. He studied Law in Vienna and probably Pest, where he was a member of the Romanian students' society and colleague with other future MPs in the Parliament of Hungary, among whom were the brothers Alexandru and Eugeniu Mocsonyi, representatives of one of the most influential Romanian families of the time. During the 1870s he experienced a fast career advance in the administration of Krassó-Szörény / Caraş-Severin county, in south-eastern Hungary (Banat). After reaching the rank of county commissioner (*alispán* – the highest elected position at county level) he lost it due to the new Lord Lieutenant's need of imposing his own trustee. Immediately

after, in early 1884, he decided to run in by-elections for a parliamentary seat in his home constituency, with the program of the LP, which he won fairly easy. However, following this short mandate at the end of the parliamentary cycle 1881–1884, he lost his seat in the summer of 1884 because he was forced to give up running in his home constituency in favour of László Tisza, brother of the Prime Minister Kálmán Tisza. In order to fulfil inner party arrangements, Simonescu had to run for a seat in a neighbouring constituency, where he was defeated by the candidate of the RNP. This was the moment when, probably highly frustrated by this failure, he gave up working with the LP and the Hungarian government and administration and returned to the ‘national Romanian’ camp. He left his home county and moved to a bigger city, in a relatively neutral position: secretary of the Orthodox Metropolitan in Sibiu / Nagyszeben / Hermannstadt. In the years that followed he clearly experienced an increased involvement in the Romanian associational life, as member and then cashier of the Association for the Culture and Literature of the Romanian People and as an influential lay member of the Orthodox church administration. His son was civil servant in Szeben / Hermannstadt / Sibiu county, one of his daughters married a Hungarian army officer, and the other married Dr. Gheorghe Proca, consistory assessor of the Orthodox Metropolitan in Sibiu. He died there in 1915, and his funeral was conducted by the archimandrite Eusebiu R. Roșca (one of the most influential Romanian church figures of the time) and attended by numerous county officials (Iudean 215-218).

All the information in the previous paragraph was provided by the aforementioned biographical sketch. A small part of it was already recorded in HDG (i.e. his positions in the county civil service, his short parliamentary career and unsuccessful candidature, the Astra membership) due to the transfer of information from digital sources such as: the Hungarian yearly civil service directories (“Magyarország” 1873-1918) and the list of Astra’s members (“Transilvania” 1900-1919), or from secondary literature (Popovici 75-91, 103-112, 135-148, 156-167, 171-175). Although the short biography in itself seems to provide enough information for reconstructing Simonescu’s life course, when it comes to understanding and explaining some of his actions and decisions, new data gathered by HDG from other serial sources, unaccounted for by the narrative approach, proves to be essential.

The lists of RNP members between 1881–1892 shows Simonescu (registered as “Leonțiu” instead of “Leontin”) has attended the national conference in Sibiu from January 1892, as a representative of Teke / Teaca constituency (Kolozs / Cluj county). This small piece of information does not only pinpoint the continuation of his political activity, but highlights a series of less visible aspects. Firstly, it signals his involvement in the power-plays atop the party and the related networks: failing to be elected as representative of his

home constituency, he made use of a connection in a remote constituency (which he probably never visited in his life) in order to secure his presence at the conference. Secondly, it raises the question: towards what end wanted Simonescu to be present specifically at this conference given that he showed no interest in the previous ones? The answer lies partly in his biography. In 1892, the party faction headed by his old university colleague Alexandru Mocsonyi, supported by a smaller one gravitating around the Orthodox Metropolitan (his employer) had a hard time maintaining majority in the party board. In this crucial moment Simonescu was probably there in order to help his friends secure the leadership against inner-party opposition – which actually they failed to do (Maier 161-167).

A glance at the board of trustees of the most important Romanian bank in Transylvania (“Albina”),² also brings up Simonescu’s name, in relation with some of the most prominent figures of the Romanian society in Sibiu: important members of the Orthodox church administration (Ilarion Pușcariu, Ioan Hannia, Eusebiu Roșca), high county officials (Ștefan Stroia, Ioan Crețu), influential freemasons (Aurel Brote) and the vice-president and future president of RNP (George Pop de Băsești) (“Anuarul” 1900-1919). The data above offers a glimpse at Simonescu’s professional networks and it might offer the explanation for his son’s relatively fast career in the county administration. According to the civil service yearly directories (currently in the process of transfer into HDG), Alexandru Simonescu functioned from 1905 to 1906 as intern, and from 1907 to 1917 as notary of the orphanage see of Szeben County (“Magyarország” 1905-1918). Thus, it was most probably no coincidence that he occupied the position vacated by Ioan Crețu, former trustee of “Albina” bank alongside his father. It was also probably no coincidence that Simonescu retired at around the same time from both the position of Astra cashier (1902), and “Albina” board of trustee member (1903), a situation which, even lacking other sources, points in the direction of either health problems or strong disagreements with his colleagues.

Looking back at the evolution of the biographical narrative based on the information from HDG the questions arises: how and to what extent did the employment of a prosopographical database helped historical knowledge and understanding by seemingly minor additions to a person’s biography? After all, we are talking in this case about being present at a party conference for one day and being member of a trustee committee for several years (Fig. 4).

² Currently HDG contains information about the personnel of the ten largest Romanian banks in Transylvania between 1895-1918 and we are constantly working on adding data about new financial institutions based on the banking system yearbooks of the time.

To begin with, the new data was extracted from sources usually lacking a name index, thus hard to approach otherwise in a biographical inquiry. Only a prosopographical approach would justify the effort invested in transferring into a database serial sources covering several decades, which in turn could provide life course information for hundreds of persons.

Still, is this information really useful at an individual level beyond the historian's mere desire of getting to know as many facts from the past as possible? Truth is, the information in itself only gains weight and relevance after being connected with previously known facts about the person's life (e.g. that he was a colleague with A. Mocsonyi, that his son quickly became orphanage see notary, that he retired from various positions at about the same time) and only after being placed into the wider context of the Romanian society and politics of the time. Thus, the real and great benefit of HDG was not providing new information (although this is also a benefit in itself), but making it relevant through connections with the subject's biography and by contextualizing it by means of the whole data gathered and hosted by it.

ID	Entity A	Source Entity A	Value	Attribute	Entity B	Source Entity B	Observation Start Period	Observation End Period	Action Calendar	Remarks	Author	Date	Source Entity A Url	Source Entity B Url
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001
1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002
1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003
1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004

Fig. 4. Person entries in HDG

Furthermore, it is not only the facts and explanations that bear value in this case, but equally the unanswered questions and the hypotheses that sprung up at the point in which faded facts require fresh data in order to certify and expand their meaning. Through which connection did Simonescu get elected for the party conference in Teke constituency, 175 km away from home? Is there any other proof, beyond him being colleague with I. Crețu in the trustee board, that he made use of his relations to find a cosy office for his son? What happened in 1902–1903 which made him step down from a series of lucrative positions?

Conclusions

The case studies, despite covering completely different historical contexts (which is why they were purposefully chosen in the first place), illustrate the analytical possibilities opened by prosopographical databases when working with information dissipated in various sources, incompletely digitized or just not linked. In the first case the sources have been digitized and could be found in the same epigraphic database, but lacking entity resolution; in the second case the sources are digitized in their original form (scanned newspapers), but they lack proper standardized name indices (given that names are recorded in either Hungarian or Romanian, in different versions for each language) and entity resolution, so identifying an individual and linking him to other datasets is virtually impossible without the use of a database.

Thus, we have concluded that prosopographical databases bring forth advances on three different epistemological levels:

a. by accommodating and linking information from multiple sources, they ease and augment access to knowledge of historical facts, thus helping to recreate more detailed individual life courses which in their turn populate a more vivid historical context;

b. by placing various, seemingly unrelated, facts in a wider context, they allow a better understanding of particular individual life choices, both in relation to one's past and to the societal habits of the moment in which the fact was registered;

c. by ordering and structuring facts they can highlight patterns or similarities with the potential of generating new research question.

To sum up the previously highlighted ideas, the great benefits of digital tools specially designed for a certain type of project/for answering specific research questions lie in the accordingly structured person-records, the very precise querying options and – last but not least – the theoretically correct and complete (not exclusively machine made, but crossed-checked by a scholar who actually understands the historical realities behind the data) aggregation of the necessary sources. In the above-presented cases, piecemeal biographical data allowed the possibility of recreating life courses and more importantly, of explaining life choices when traditional ego-documents and ego-narratives—which form the base of traditional historical research—proved to be scarce, parsimonious, or even lack entirely.

Acknowledgements

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Works Cited

- Anuarul Băncilor Române*, vol. II (1900) – XX (1919),
<http://dspace.bcucuj.ro/handle/123456789/82910>. Accessed January 2019.
- Bertolini, Dario. *Notizie degli scavi di Antichità*. Tipografia della R. Accademia dei Lincei, 1885.
- Iudean, Ovidiu Emil. *The Romanian governmental representatives in the Budapest Parliament (1881-1918)*. Mega, 2016.
- Keats-Rohan, Katharine. "Prosopography and computing: a marriage made in heaven?" *History and Computing*, vol. 12, no. 1, 2000, pp. 1-11.
- Magyarország tiszti czim- és névtára*, vol. I (1873) – XXXVII (1918),
<https://adtplus.arcanum.hu/hu/collection/TisztiCimtar/>. Accessed January 2019.
- Magyarország tiszti czim- és névtára*, vol. XXIV (1905) – XXXVII (1918),
<https://adtplus.arcanum.hu/hu/collection/TisztiCimtar/>. Accessed January 2019.
- Maior, Liviu. *Memorandul, filosofia politico-istorică a petiționismului românesc*, Editura Fundației Culturale Române, 1992.
- Mandemakers, Kees and Lisa Dillon, "Best Practices with Large Database on Historical Populations." *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, vol. 37, no. 1, 2004, pp. 34-38.
- Popovici, Vlad (ed.). *Acte și documente privind elita politică românească din Transilvania 1869-1896*. Mega, 2010.
- Transilvania*, vol. XXXI (1900) – L (1919),
<http://documente.bcucuj.ro/web/bibdgit/periodice/transilvania/>. Accessed January 2019.
- Varga, Rada. "Aurelius Aquila, negotiator ex provincia Dacia. A prosopographic reconstruction." *Mensa rotunda epigraphica Napocensis*, edited by Radu Ardevan and Eugenia Beu-Dachin, Mega, 2016, pp. 27-34.
- Varga, Rada. "Romans 1 by 1 v. 1.1. New Developments in the Study of Roman Population." *Digital Classics Online*, vol. 3, no. 2, 2017, pp. 44-59.
- Varga, Rada. "Romans 1 by 1. Documenting a Population Database for the Roman World." *Digital and Traditional Epigraphy in Context. Proceedings of the EAGLE 2016 International Conference*, edited by S. Orlandi, R. Santucci, F. Mambrini, P.M. Liuzzo, Sapienza Università Editrice, 2017, pp. 333-341.
- Varga, Rada, Annamária-I. Pázsint, Imola Boda, and Dan Deac. "Romans 1 by 1: Overview of a Research Project." *Digital Classics Online*, vol. 4, no. 2, 2018, pp. 37-63.
- Varga, Rada, Annamária-I. Pázsint and Angela Lumezeanu. "Romans 1 by 1. A Database Manual." *Studia UBB Digitalia*, vol. 63, no. 2, 2018, pp. 31-49.

PANTHEON 3D.

An Initiative in the Three-Dimensional Digitization of Romanian Cultural Heritage

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Abstract: The *Pantheon 3D* cultural programme is the most ambitious initiative in the field of new technologies applied to archaeological heritage carried out by the National Museum of Unification in Alba Iulia, one of the few at national level. In concept, the programme aims to render valuable the Roman artefacts belonging to the museum, using interdisciplinary methods. Via modern technologies and 3D documentation, Roman art works are digitized with the goal of accomplishing a virtual collection and a 3D interactive platform. The *Pantheon 3D* exhibitions and publications offer examples of three-dimensional models using specific techniques of non-textured rendering of surfaces, useful within studies of art history and as virtual models for artistic and iconographic interpretation.

Keywords: 3D digitization; 3D scanning; 3D printing; cultural heritage; cultural programme; Roman art; Apulum; virtual collection; interactive exhibition

Introduction

The current article aims to get readers introduced to an exciting project implemented within the National Museum of Unification in Alba Iulia by a group of specialists¹ (archaeologists, conservators/restorers) and their collaborators and partners. The museum

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counts among the most important museum institutions in Romania, considering both its heritage and scientific prestige. It is also involved in numerous cultural activities, spanning from research and all the way to the protection and conservation of the national heritage. The Museum's collections contain valuable pieces of Roman art from Dacia, but also from the Hellenised area of Asia Minor. These are artefacts originating from Apulum (ancient Alba Iulia), the largest Roman site of the province of Dacia.



Fig. 1. Museum's permanent exhibition (Roman art collection)

About the programme

The *Pantheon 3D* cultural programme aims at the interdisciplinary enhanced use of Roman archaeological heritage through modern technology: 3D digitizing of the Roman artworks depicting deities and mythological figures in the collection of the National Museum of Unification in Alba Iulia, the accomplishment of a virtual collection and an interactive 3D platform, but also via the classical methods: temporary exhibitions on the topic of Roman religion and art at Apulum, publications, papers and workshops for pupils and students.

Pantheon 3D has been declared a winning project in the funding session of the National Cultural Fund Administration (AFCN) I/2018 for the area of Multiannual Programmes, to be implemented by the National Museum of Unification from Alba Iulia over 2018 – 2019.

The enhanced use of the mobile cultural heritage through digital technology in the context of inter/multi-disciplinary approaches brings to the forefront the 3D scanning and photogrammetry as independent documenting methods, which may be though easily integrated in the flow of documenting operations specific to the cultural heritage.

The museum objectives of the programme consider the insertion of the new digital technologies in museum language and in the exhibition design, with the aim of improving contact with the visiting public. Facilitating access to the heritage for the wide audience is one of the specific objectives of the programme. Thus, the proposed activities target the setting of an information technology infrastructure by the accomplishment of an interactive platform – a virtual exhibition that allows access to the information existent in the database, the exhibition of the replicas of Roman art pieces that comes to the support of vision impaired persons.

The academic objectives aim at ensuring free access of the researchers to the scientific information and 3D digital technology applied to Roman artworks, by compiling the virtual collection for online use on the site of the National Museum of Unification in Alba Iulia. This entails a generation of new study opportunities in the field of Roman art, by immediate access to this virtual collection that provides high precisions digital models, accompanied by technical, iconographical and bibliographical data.

Pantheon 3D activities are interdisciplinary and support the two methods of heritage valuation – classical and modern – thus generating mechanisms and durable processes, namely continuation and multiplication of results. For Romania, it is most certainly an important enterprise, with a very high potential of becoming a significant landmark on the market of cultural products, both regionally as well as at European level.

Pantheon 3D counts among the projects in the field of the material, immaterial and digital cultural heritage developed in 2018 under the aegis of the European Year of Cultural Heritage, with the status of official event.

Within the *Pantheon 3D* cultural programme we established partnership with the following institutions: the City Hall of Alba Iulia, the Babeş-Bolyai University of Cluj-Napoca, the “1 Decembrie 1918” University of Alba Iulia, Brukenthal National Museum of Sibiu, the Museum of Dacian and Roman Civilisation of Deva, the History Museum of Turda, the “Regina Maria” Arts High School Alba Iulia, the “Horea, Cloşca şi Crişan” National College Alba Iulia and the Romanian Association of the Blind – County Branch of Alba.

The cultural heritage and three-dimensional digitization

The interest in the development of virtual aspects in the museum environment is increasingly obvious nowadays, with many efforts recorded in the last ten years being in the draft and development of those 3D technologies that would allow an as realistic as possible documenting and rendering of both mobile and immobile cultural heritage. Meanwhile, the concept of cultural heritage has become progressively more complex, hence the preservation – restoration operations have also implied more and more subjects, the correlation and interpretation of resulted data being ever more important in the adequate use of the provided potential. The new IT technologies, databases and the Internet make now possible improved coordination and integration of various data types resulting from these coordinated efforts.

Consequently, record and documenting methods and information management have become key pieces within the decision processes whose topic is cultural heritage, being entirely integrated to research, investigation, treatment and monitoring activities. Important advances have been recently registered also in the sphere of survey, documenting and enhanced use means, as well as in the field of conservation and restoration. Thus, new methods for data collection, new sensors, visualising equipment and interaction platforms have been created.

If the traditional documenting of mobile cultural heritage through photographs and drawings has been not until long ago sufficient for the efforts of the scientific community, one may presently speak of a true revolution in visual rendering and analysis, boosted by significant advances of digital technologies. Within this context, the computational photography documentation and structured light 3D scanning are two techniques that put at the disposal of academics, but also of the wide audience, interactive three-dimensional products easily disseminated in the on-line environment. Such digital representations have gradually replaced in research and education milieus (museum included), the classical photographs, drawings and films, bi-dimensional products lacking in most cases high precision and interactivity.

The field of computational photography, chiefly digital, as well as the computer processing currently work together in order to create solutions for an as complex as possible three-dimensional rendering of the surfaces and textures of heritage objects but also of archaeological monuments and sites, significantly contributing to specialty documenting. In parallel, there is notable increased attractiveness of museum collections in the eyes of the public of every age. In completion, the structured light 3D scanning

method has been recently playing an important role in the quick high precision digitizing of museum collections, a conclusive example being provided precisely by the *Pantheon 3D* cultural programme as well.

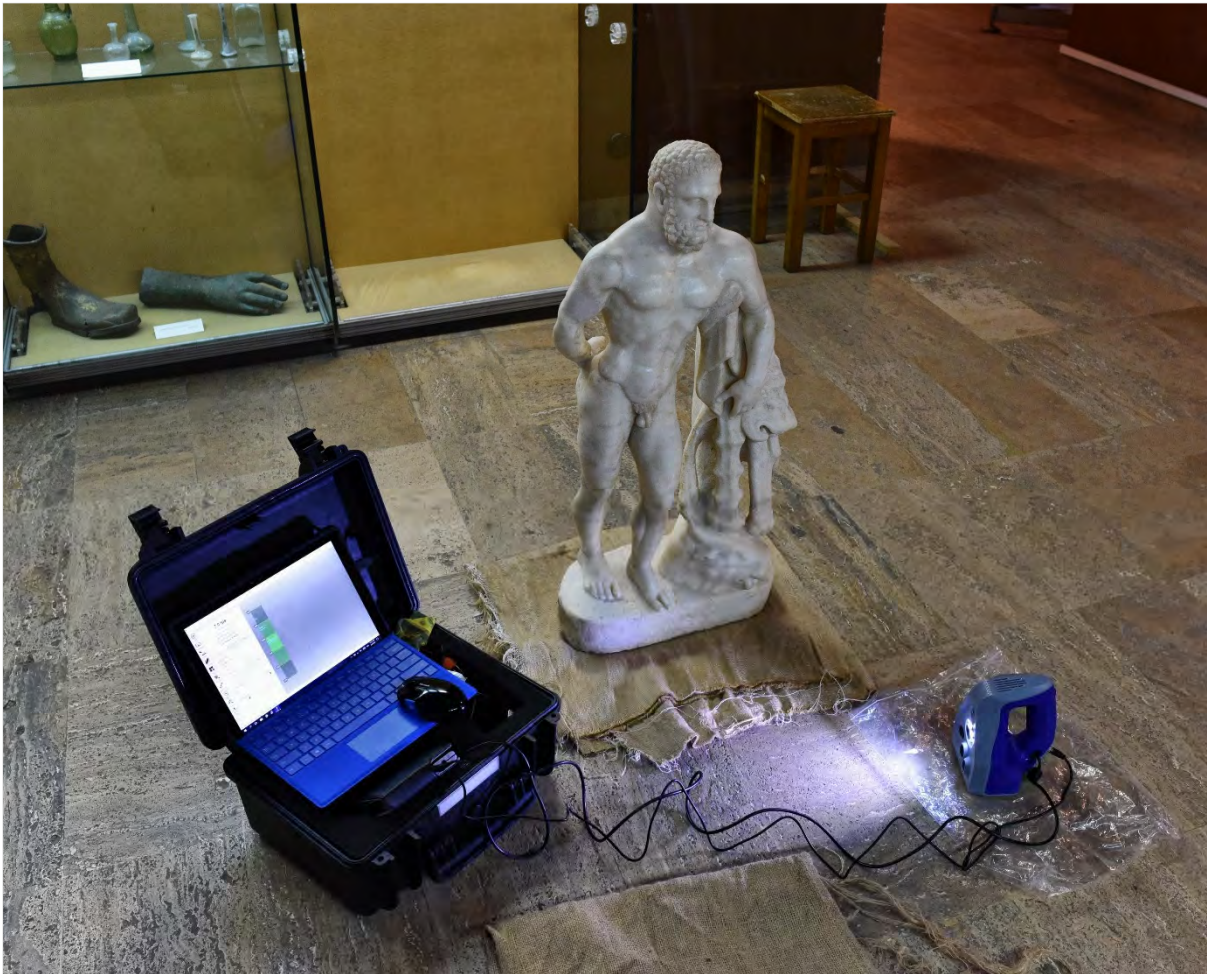


Fig. 2. Preparing the statuette of Hercules for 3D scanning

The documenting and enhanced use of the mobile heritage via the three-dimensional technologies, are very well defined in the ensemble of the digitizing operations with the goal of protecting and rendering valuable the cultural heritage at worldwide level.

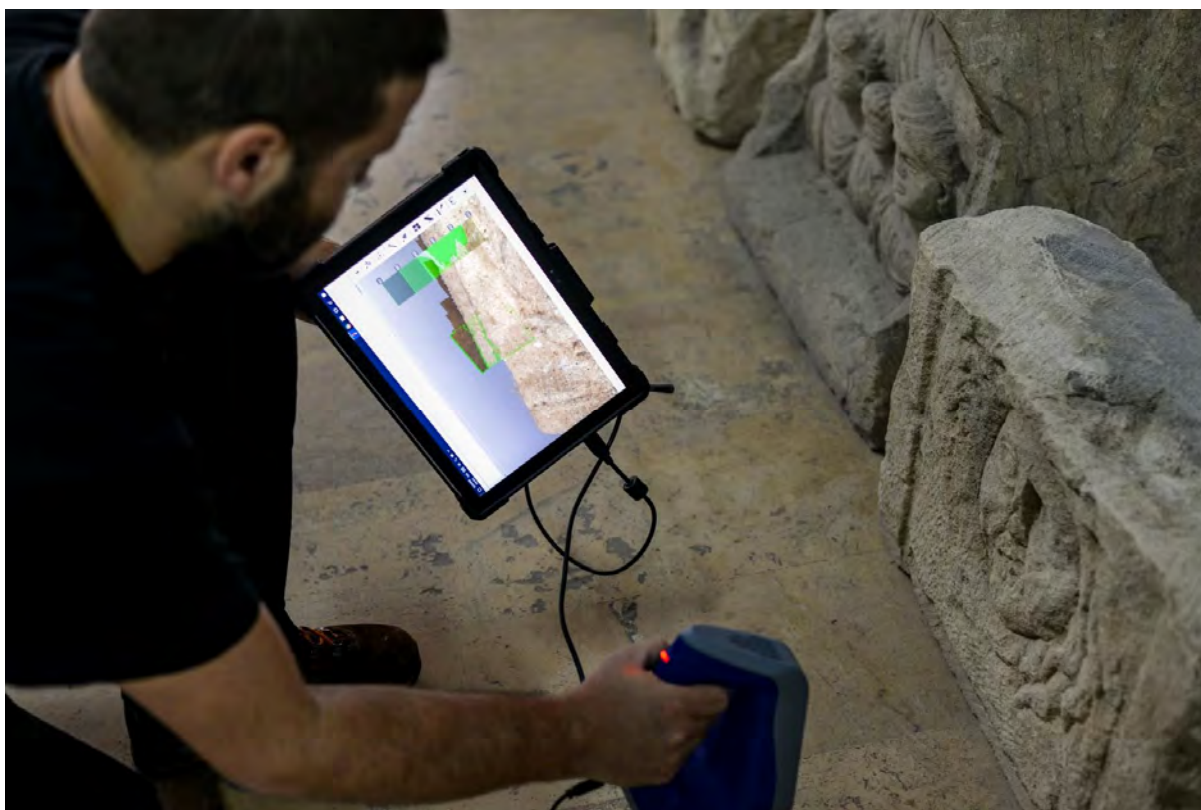


Fig. 3. 3D scanning Medusa's head on a Roman funerary monument

Structured light scanning of the artefacts

Recently, there has been intensified use of active sensors, laser and structured light in the three-dimensional documenting of cultural heritage objects, such high resolution and accuracy data being thus able to be disseminated for the interest of both scientific research and the broader audience, through museum and online enhanced use. The projection on an object's surface of a very narrow light strip produces at its turn a lighted line that seems distorted from any view other than its source, thus allowing, via several calibrated digital cameras to geometrically reconstruct the surface of respective object. A more versatile method is the projection of a complex network of such strips by using laser projectors, thus allowing registration of a very high number of data regarding the object's surface, with remarkable accuracy and in a short period of time. Compared to the passive method of photogrammetry, these sensors supply direct 3D information on the surface of the scanned object, in the form of point clouds.

The precision of the system we used, the Artec SpaceSpider scanner, is of metrological order, down to 0.05 mm, the generated 3D patterns being used in both applications of virtual museum type and detailed analysis of researched surfaces, high precision measurements etc. This scanner type may be used on various objects of different sizes, with the mention, that at this level of detail, the processing of large data sets may turn problematic. Thus is collected detailed information on the geometry, volume, colour and texture of the surfaces of an object without any effective contact, the result consisting in a graphic, digital rendering of their three-dimensional physical structure, a virtual surrogate.



Fig. 4. Aspects from the processing of 3D structured light scan data.

a) individual scans by color; b) final rendering (mesh); c) final rendering (mesh + texture)

3D Printing for museums, research and education

The *Pantheon 3D* programme sets out, in a first phase, to answer a specific need to optimize the degree of public interaction with the classical museum environment, bringing into use new ways to exhibit, based exclusively on the latest technologies available

from 3D scanning and printing. If our digital interactive on-line exhibition answers a first requirement towards interactivity and diffusion, both towards the public and the scientific environments, 3D printing comes to put forward a consistent message, facilitating direct tactile interaction with archaeological heritage artefact replicas, thus ensuring access to those visually impaired, most often forgotten by the classical museum display.

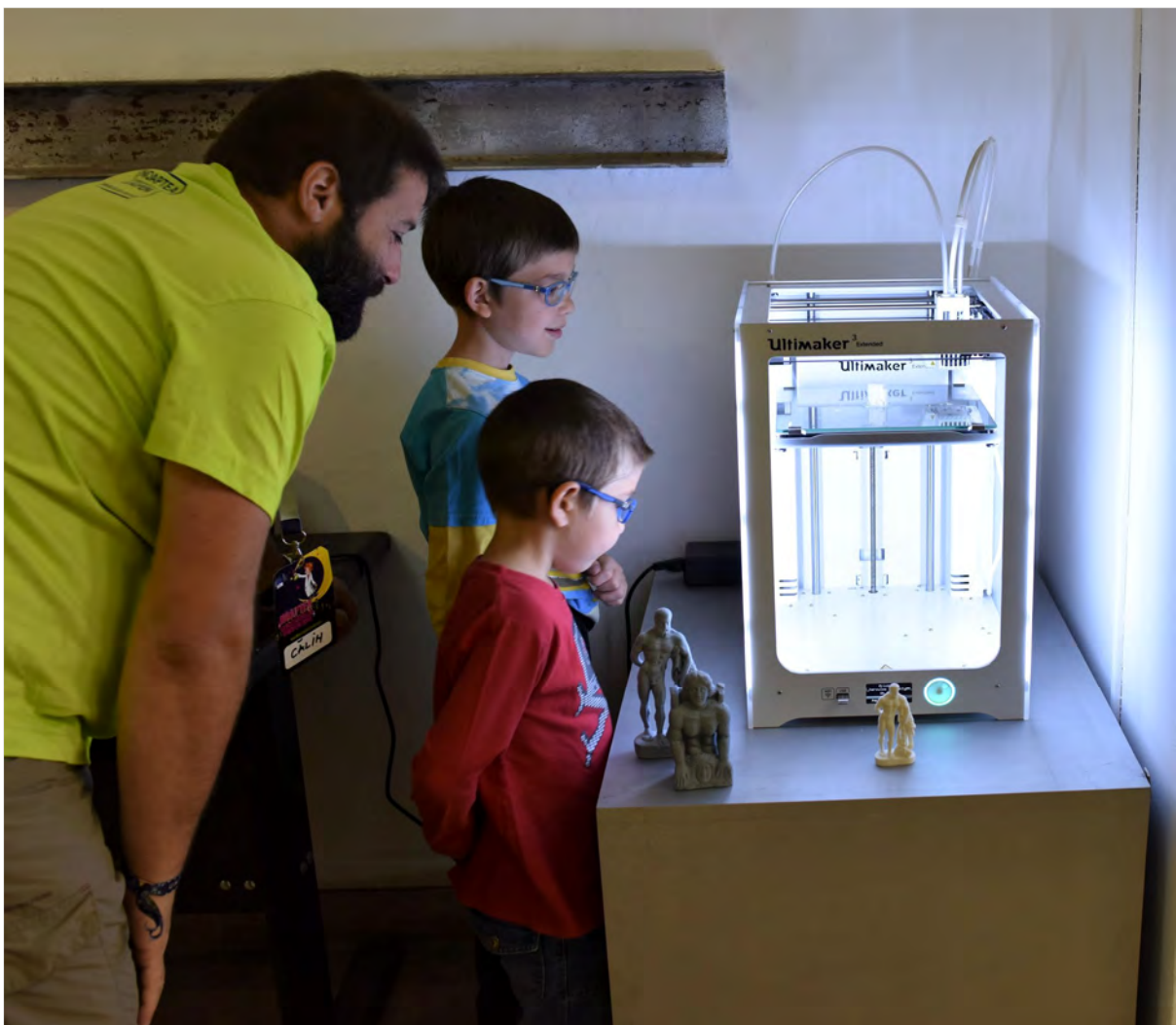


Fig. 5. Kids seeing a 3D printer for the first time (European Researcher's Night 2018 at the National Museum of Unification from Alba Iulia)

We can identify an entire series of advantages derived from using 3D scanning and printing in museum sciences and archaeological research, from documenting the smallest detail to three-dimensional archiving of contexts and artefacts that are threatened by the passage of time (erosion, etc.) and by conflict or natural disasters, all the way to consistently improving accessibility of collections. These technologies can also be used to replicate or complete damaged artefacts, as part of specific conservation and restoration practices. Within this entire context, our *Pantheon 3D* programme aims to create, in a first phase, accurate scaled copies of our most representative artefacts, to be used in facilitating tactile interaction, specially aimed at visually impaired people and not the least to children of all ages. These replicas can also be used within our museum and also as part of worldwide educational experiences, as subject of art history lessons for example, not excluding specific uses within the research community.

A next stage within our project is to attempt repairs and integration of 3D printed missing parts that can be perfectly applied to the existing surfaces, based on scientific information and/or clear analogies from those times. The entire operation starts with making sure that the 3D model is ready for printing, a main requirement being that it is hole-free, with complete surfaces. With the use of dedicated software (*Ultimaker Cura 3.6*) this model is then imported, rotated and scaled for optimal printing, the resolution is selected and also the degree in which the interior of the print is filled in. If the model is complex, with isolated and suspended surfaces (such as an extended arm) it is necessary to generate and print a support structure to allow for a complete and high quality printing of these particular areas. This support structure will be created also by the printer, using the second printing head, fed with a special plastic that can be easily removed later. The entire model and its created support structure is then fragmented into thousands of horizontal layers by the software and then each are delivered to the printer, one by one. The minimum thickness of a layer is 0.1 mm (with certain materials 0.06 mm can be achieved), the resulting surfaces being very smooth, almost flat. The 3D printing of a high resolution (0.1 mm) 29 cm high version of Hercules marble statuette took 3 days, 16 hours and 55 minutes to complete, using 37 meters (296 grams) of PLA filament and 21 meters (165 grams) of break-away filament.

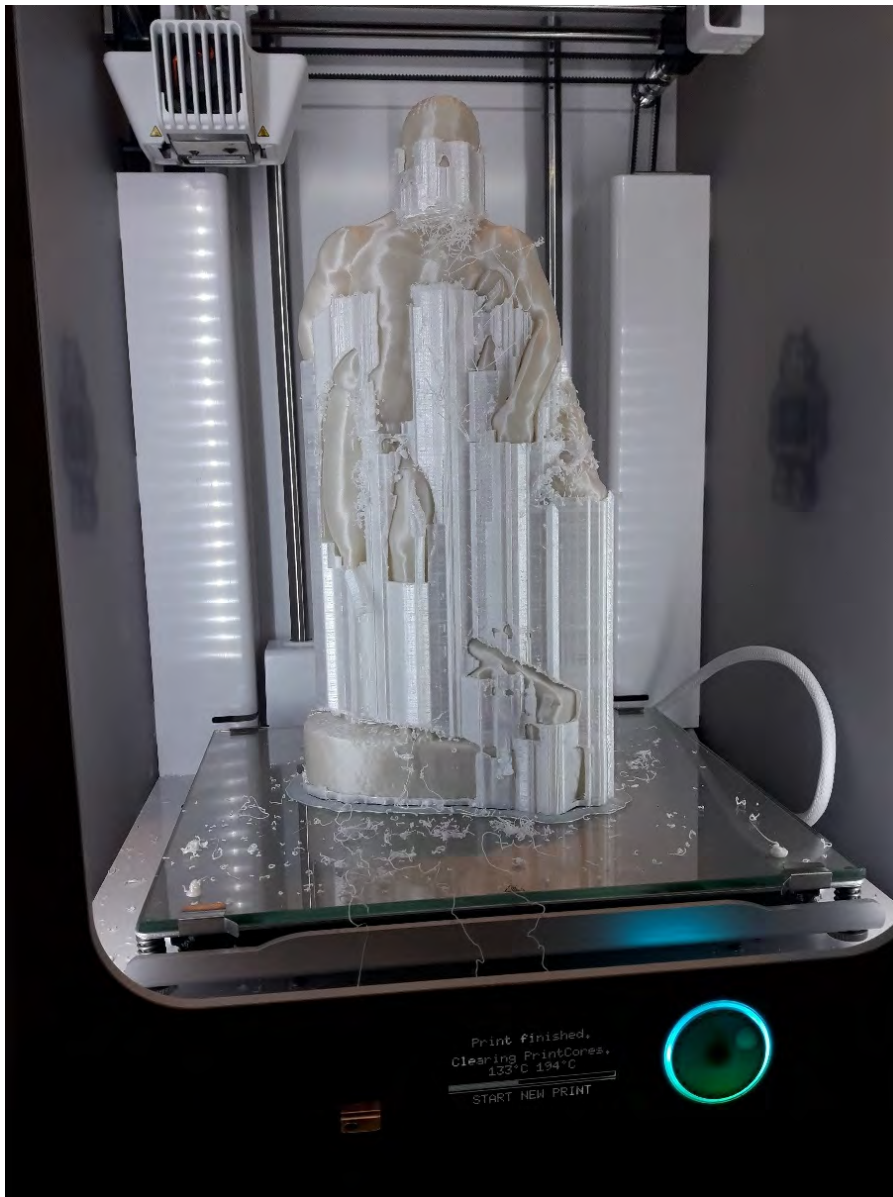


Fig. 6. 3D printing Hercules

Replicating artefacts with 3D printing and providing access to an online virtual museum could become essential steps into changing the perspective of museum environments, by restoring some essential aspects into the cultural experiences provided, like tactile and multi-sensorial interaction.



Fig. 7. Jupiter Zbelsurdos – the Roman original and its 3D replica

Pantheon 3D exhibitions and the virtual collection

During 2018, the *Pantheon 3D* programme hosted several activities at *The Night of Museums* and *The European Researchers' Night*. The most important events were the two themed temporary exhibitions: *MYTHOLOGY 3D* and *MYSTERION 3D*.



Fig. 8. Pantheon 3D at The Night of Museums 2018

MYTHOLOGY 3D. GRECO-ROMAN MYTHS – CLASSICAL AND MODERN ARTISTIC EXPRESIONS was the first exhibition held within the *Pantheon 3D* cultural programme. Its opening took place in May 2018, in the exhibition space of the *Principia Museum*, where the visitors journeyed to the mythical time of the Gods and Heroes of the Greco-Roman world. The exhibition featured pieces of Roman art depicting mythological figures and scenes from the Roman art collection of the National Museum of Unification in Alba Iulia, most of them discovered in ancient Apulum. The exhibition concept has joined creatively and uniquely the Roman artworks with the classical mythological tales, with the artistic interpretation of the pupils with the “Regina Maria” Arts High School of Alba Iulia. Subsequently, these works were presented within their graduation examination and put on display temporarily with the Art Gallery of Alba Iulia.



Fig. 9. Mythologia 3D at Principia Museum



Fig. 10. Mythologia 3D

The *Pantheon 3D* series of events continued with an invitation into the hidden universe of the mystery cults in the ancient Greco-Roman world. The exhibition *MYSTERION 3D. SAVIOR GODS, MYSTERIES AND RELIGIOUS SYNCRETISM AT APULUM* opened at Museikon in November 2018. Visitors came into the atmosphere of an exhibition which combined the classic display of the museum's Roman art collection with the modern technology used in 3D digitization of the archaeological heritage of Apulum.



Fig. 11. *Mysterion 3D* at Museikon

Gods and goddesses with origins either in the extravagant Orient, or in the mythological traditions of the Thracians and Celts, have entered the *pantheon* of Apulum. They were part of a world marked by religious diversity and syncretic phenomena. Fascinating divinities, like Mithras, Isis or Serapis, were extremely popular in Antiquity,

and their mysteries became religious trends. Numerous followers have been attracted by the orgiastic character of the ceremonies, or the esoteric nature of the initiation rituals and sacred liturgies (*hieroi logoi*). The savior and mystic gods promised the salvation of the soul, and were offering a positive perspective on life after death. Furthermore, their pantheist nature also recommended them as protectors, healers, and prosperity bearers.



Fig. 12. Mysterion 3D. The Mithraeum

Mysterion 3D suggested a new initiation that is in the “mysteries” of 3D digitization. It is an introduction in the themes of an advanced method for the documentation, research, and virtual archiving of cultural heritage, a method which has been attracting more and more followers in the recent years.



Fig. 13. Mysterion 3D. Jupiter Zbelsurdos 3D presentation

Each exhibition had an interactive 3D presentation. *GODS ON DISPLAY* was the 3D exhibition part for visualising the Roman artworks depicting gods and mythological figures. The presentation was made with the aid of an interactive device with touch screen which allowed the online access and visualising by the visiting public of the collection of Roman sculptures 3D models available at <https://sketchfab.com/MNUAI>, through the platform Sketchfab.com. The *Pantheon* 3D virtual collection existing on *Sketchfab* includes until now the Roman art works from the National Museum of the Unification's heritage that were the subject of the two exhibitions. This *virtual museum* will be further developed as our programme will advance, with the aim of its integration in international and national digitizing programmes of the cultural heritage, like for instance the European Digital Library - Europeana.eu.

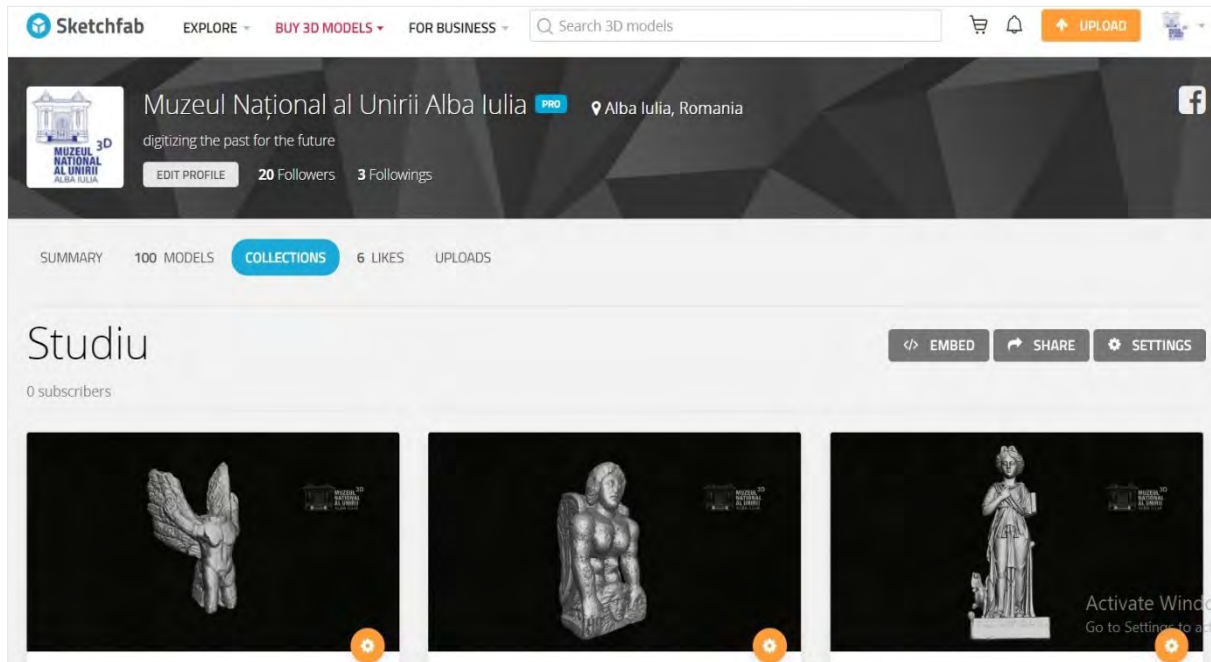


Fig. 14. The Museum's virtual collection on Sketchfab

Pantheon 3D in the future

Digital documenting of the tangible cultural heritage based on 3D scanning, modelling and printing may open the museum to the entire world. The importance of such initiatives is indisputable within the framework of urgent protection, recovery and restoration of cultural heritage measures in risk areas or in the context of catastrophes, like those in the Middle East or Brazil.

When we originally set forth, we imagined the aims of the *Pantheon 3D* programme, then in a draft form, as threefold: museum, educational and for research. Beside the necessity to integrate latest digital technologies in the concept of museum exhibition and use of the archaeological heritage, as well as in the conservation-restoration processes, the accomplishment of the 3D Digital Collection comprising pieces in the museum's heritage, a collection accessible online, represented an important aspect of our approach, while amongst the reasons, concerns related to possible critical situations did not lack.

Information technology and the image culture are aspects that acquire day by day an increasingly more important role in the educational field, in both education and museum milieus. To this effect, are required continued and sustained efforts to integrate new technologies as part of the educational act as well as attractive, even entertaining activities within museums.



Fig. 15. GODS ON DISPLAY (European Researcher's Night 2018)

Through its purpose and objectives, the nature and structure of the activities, the interdisciplinary concept and the use of 3D technology, *Pantheon 3D* programme will be able to generate modern structures, platforms and resources (human and technological) that will ensure not only its continuity but also multiplication. The results and the products of the cultural programme are sustainable. The interactive digital platform using 3D technology can promote the museum heritage, and could be a model to be followed for new approaches in the use of cultural heritage.

The main element of sustainability and continuity in this case is the possibility of adding new pieces of museum collections and increasing their international visibility. Through its activities, *Pantheon 3D* generates new and innovative cultural products

that are the result of intelligent management of human resources involved in the program and the use of creativity in a space where artistic innovations blend harmoniously with modern digital technology. In an international context, the programme can be considered a normality in itself, since the three-dimensional digitization activity is already a standard activity in the museums.

Bibliography

The programme presentation and the information on 3D technology have been taken from the *Pantheon 3D* volumes published so far:

Timofan, A. (ed.). *Pantheon 3D I Mituri Greco-romane. Greco-Roman Myths*. Mega, 2018.²

Timofan, A. (ed.). *Pantheon 3D II Zei Salvatori – Culte de mistere – Sincretism. Savior Gods – Mystery Cults – Syncretism*. Mega, 2018.³

² <https://apulumarchaeology.files.wordpress.com/2018/11/pantheon-3d-vol-i-mituri-greco-romane-greco-roman-myths-editura-mega-cluj-napoca-2018.pdf>

³ <https://apulumarchaeology.files.wordpress.com/2019/02/pantheon-3d.-vol.-ii-zei-salvatori-culte-de-mistere-sincretism.-savior-gods-mystery-cults-syncretism-editura-mega-cluj-napoca-2018.pdf>

Book Review

***Digital Classics Outside the Echo-Chamber: Teaching, Knowledge Exchange & Public Engagement*, Gabriel Bodard and Matteo Romanello, editors, London: Ubiquity Press, 2016. ISBN (Paperback) 978-1-909188-48-8 – Book Presentation**

This volume reunites several papers from the Digital Classics, a relative narrow field of Digital Humanities. Some of the chapters were among papers presented at seminars in London and Berlin, however most of them were especially drafted for the present volume. The volume targets scholars in Classics, Archaeology and History, but the editors believe it will also be accessible to teachers and students, as well as non-academics with an interest in the topic.

The volume opens with a list of contributors to the volume, delineating their expertise in the topic of Digital Humanities, as well as their past and ongoing projects. It is followed by an Introduction signed by the two editors, who underline their concern to increase public awareness into this topic, thus making the volume available on open access (<http://www.oapen.org/search?identifier=649985>).

The book is divided in three sections as we can also see from the title: Teaching, Knowledge Exchange, and Public Engagement.

Section 1 Teaching presents the contribution of digital humanities in teaching and learning the classics. It has five chapters. In Chapter 1 “Learning by Doing: Learning to Implement the TEI Guidelines Through Digital Classics Publication” Stella Dee, Maryam Foradi and Filip Saric talk about the encoding of texts by XML following the Text Encoding Initiative (TEI) Guidelines. They also give a review of the current online resources available for learning TEI and the challenges that arise - like technical difficulties, the need for internalisation, localisation and vertical scripts.

In Chapter 2 “Open Education and Open Education Resources for the Teaching of Classics in the UK”, Simon Mahony emphasizes the importance of open repositories for teaching classics with focus on the UK. He is discussing a few online repositories from UK and reveals the need of creating and sharing these resources on every level of teaching.

Gabriel Bodard and Simona Stoyanova discuss the training workshops for teaching EpiDoc in Chapter 3 “Epigraphers and Encoders: Strategies for Teaching and Learning Digital Epigraphy”. They start with a history of the EpiDoc training with 2 major phases and continue with the structure and the content of these workshops. The

main target is represented by the classical epigraphists and papyrologist, with no skills in digital humanities. They discuss the new models that can be integrated in the future like XSLT, XPath and project management. In the second part they draw a parallel between teaching epigraphy and digital epigraphy, and emphasize that there are no differences and thus they can be taught together.

Chapter 4 “An open Tutorial for Beginning Ancient Greek” by Jeff Rydberg-Cox describes the developing of an online tutorial for learning Ancient Greek addressed to the Beginners. The author presents the main functions of the web page and how it tries to keep the users engaged by methods outside the traditional academic teaching. Based on Google Analytics the author shows how this online resource is useful for the students, but also for people outside the academia.

The last Chapter of Teaching section is “The Ancient Greek Dependency Treebank: Linguistic Annotation in Teaching Environment” by Francesco Mambrini. In Treebank the syntactic structure of the sentence is represented in a tree form. Using an example from Sophocles’ *Women of Trachis* the author shows the advantages of using the Treebank and how the students can learn how to read complex literary texts and the methods of interpretation.

The Section 2 Knowledge Exchange is centred on interdisciplinary studies and the challenges in making different disciplines work together. In Chapter 6 “Of Features and Models: A Reflexive Account of Interdisciplinarity across Image Processing, Papyrology, and Trauma Surgery” Segolene M. Tarte is discussing her work in image processing applied on different areas like Papyrology and Medicine. She talks about the need to have an understanding of the same word used in different areas. Words like ‘feature’ and ‘model’ which the author calls them T-Words - Trigger Terminology Twitch and identifying them by collaboration and communication can be a first step in a productive interdisciplinary project.

In Chapter 7 “Cultural Heritage Destruction: Experiments with Parchment and Multispectral Imaging” the authors Alberto Campagnolo, Alejandro Giacometti, Lindsay McDonald, Simon Mahony, Melissa Terras and Adam Gibson describe a project that involves multiple disciplines: medicine, conservation and image science. The project create an open dataset of multispectral images on intentional deteriorated parchments. The datasets can be used to create methods for the recovery of writing on damaged parchments. Using several forms of damage like mould or fire, the datasets provide a test for the effectiveness of the text recovery on manuscripts.

The Chapter 8 “Transparent, Multivocal, Cross-disciplinary: The Use of Linked Open Data and Community -developed RDF Ontology to Document and Enrich 3D Visualisation for Cultural Heritage” is the last of the Section. Valeria Vitale discusses a method to document 3D Visualisation in cultural heritage for academic acceptance. How 3D reconstruction can be documented in a transparent way? She is proposing

SCOTCH - Semantic Collaborative Ontology. The documented 3D objects are useful and have a great impact on sectors outside the academia like museums, restoration, urban planning.

The last Section Public Engagement contemplate on how the resources produced within academia environment can be made accessible to a larger public and how the public can be actively involved in the creation of these resources.

In Chapter 9 “The Perseids Platform: Scholarship for all! “ Bridget Almas and Marie Claire Beaulieu discuss the collaborative platform Perseids where anybody can view, edit, annotate, translate ancient documents thus contributing to an open repository of data sets. The contribution is published after an editorial review maintaining this way the quality and standards of academic scholarship.

The Chapter 10 “Engine Greek: Ancient Lives” is a description of the MySQL database with over 1.5 million of ancient Greek papyri. The author James Brusuelas discusses the challenges of engaging the public in the process of papyrology and finding a method (borrowed from DNA sequence) that process the transcription of the same document.

Finally in Chapter IX “Ancient Inscriptions between Citizens and Scholars: The Double Soul of the EAGLE Project” Silvia Orlandi is discussing the Europeana network of Ancient Greek and Latin Epigraphy and the efforts made to engage a broader public. While the main goal is to create a digital resource of epigraphy the EAGLE project developed two applications - a mobile app and a storytelling application for the public in order to promote ancient inscriptions to interested citizens.

This volume discusses a broad range of issues and is worth being read by those interested in digital classics and interdisciplinary themes. The authors of the chapters have many areas of expertise like archaeology, ancient languages and linguistics, epigraphy making this book an interesting collection for a larger public

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