Özgün Makale

Representing the Sung Poetry of Ottoman Art Music in a Critical Digital Edition in TEI XML[1]

Osmanlı Sanat Müziği Şiirinin TEI XML'de Eleştirel Bir Dijital Baskıda Temsil Edilmesi

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Abstract

The research project "Corpus Musicae Ottomanicae" dedicates itself to the critical editions of Near Eastern music manuscripts that saw increasing production from the early 19th century onwards to record music especially centered in Ottoman Istanbul. The principal way to write down this originally oral tradition was in Hampartsum notation, invented around 1812 by an Armenian of the same name before it became discontinued with the introduction of Western staff notation from 1830 onwards.

Within the project's scope, there are three areas of research and deliverables: the indexing of sources in a catalog, the music edition under consideration of modal and rhythmic principles of Ottoman music, and the text edition of sung poetry mainly in Ottoman Turkish written in various scripts. Overarching are the digital humanities to present the research output in a holistic approach. This paper will focus on the design of representing the text edition in TEI XML format.

Keywords: Digital Humanities, Critical Digital Edition, TEI, Ottoman Art Music, Poetry.

Öz

"Corpus Musicae Ottomanicae" araştırma projesi, 19. yüzyılın başlarından itibaren özellikle Osmanlı İstanbul'unda yoğunlaşan müziği kayıt altına almak için üretimi artan Yakın Doğu müziği el yazmalarının eleştirel edisyonlarına adanmıştır. Başlangıçta sözlü olan bu geleneği yazıya dökmenin başlıca yolu, 1812 civarında aynı adı taşıyan bir Ermeni tarafından icat edilen Hamparsum notasıydı. 1830'dan itibaren Batı notasının kullanılmaya başlanmasıyla birlikte Hamparsum notası kullanımdan kalktı.

Proje kapsamında üç araştırma alanı ve çıktı bulunmaktadır: kaynakların bir katalogda dizinlenmesi, Osmanlı müziğinin makamsal ve ritmik ilkeleri göz önünde bulundurularak müzik edisyonu ve ağırlıklı olarak Osmanlı Türkçesinde çeşitli yazı tiplerinde yazılmış şiirlerin metin edisyonu. Araştırma çıktılarını bütüncül bir yaklaşımla sunmak için dijital beşeri bilimler ön plana çıkmaktadır. Bu makale, metin edisyonunun TEI XML formatında temsil edilmesinin tasarımına odaklanacaktır.

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Anahtar Kelimeler: Dijital Beşeri Bilimler, Eleştirel Dijital Basım, TEI, Osmanlı Sanat Müziği, Şiir.

Introduction

The interdisciplinary and multinational research project "Corpus Musicae Ottomanicae" (henceforth CMO)[2], funded by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG), is based at the University of Münster, Germany. Under the direction of Ralf Martin Jäger, it is jointly run by the Institute of Musicology and the Institute of Arabic and Islamic Studies. In Münster, the central research task – the transcription and critical editing of nineteenth-century sources of Ottoman music written in Hampartsum (Jäger, 1996; Olley, 2017) and Western staff notation – is carried out, as well as the critical edition of the accompanying texts of vocal pieces. Archival research and source catalog data entry are located at the Orient Institute Istanbul, and data modeling for the digital editions and digital publication at the head office of Max Weber Foundation, Bonn, Germany. All three institutions collaborate closely together.

The first critical text edition within the scope of the project was started by Malek Sharif with the poetry of the manuscript TR-Iüne 204-2 (or NE204 as the CMO identifier) from 2015 on, when the project was launched. Until his leaving the project at the end of 2019, he prepared the print version of the lyrics in block text in the Ottoman alphabet, the draft transcript of block texts and text underlay in the scores, the variant readings again in Ottoman alphabet (Demirkol, in press, pp. 1-3). In September 2019, Neslihan Demirkol joined first as a second text editor, then as co-editor completing and finalizing the edition after Malek Sharif left the project. The voluminous source TR-Iüne 204-2 contains 164 pieces of music in total, of which 115 are vocal, with 94 in Ottoman Turkish and 21 in or with Persian language, either mono- or multilingual. The critical edition of the text, both in the original Ottoman (Arabic) script and a scholarly transcription in the modern Turkish alphabet, is accompanied by three apparatuses. The first one provides the control texts consulted, the second one the variant readings, and the third one general notes and other information, mostly on the lyricists. The original "printed" text edition is made available for download in PDF format (see for example Codex TR-Iüne 204-2, 2021).

By mid-2022, it was decided that this edition, as well as all forthcoming ones, will only be provided in modern Turkish transcription. This affected the digital scholarly edition in TEI XML as well, which has been in planning and development since late 2020 and early 2021 by Anna Plaksin and Frauke Pirk. After development had been suspended for a variety of reasons, the author continued the elaboration of the digital text edition from early 2022 on.

The original critical edition was prepared in the Classical Text Editor (CTE, n.d.). This word processor is specifically designed for critical editions with notes and apparatuses. However, one scope of this software is the preparation of a layout for print, and apart from the apparent PDF file format for this purpose, digital output such as HTML or XML follows the same stylistic markup. Especially the XML export merely mimics the semantic markup set by the Text Encoding Initiative (TEI, n.d.) and its current TEI-P5 guidelines for digital scholarly editing. To remedy this deficit, Anna Plaksin and Frauke Pirk created a TEI template prototype and the XSLT transformation OsPoT (2022) to split the XML export from the CTE into TEI files for each vocal piece, delete unnecessary stylistic mark-up, and add semantic mark-up (see Pirk 2021). An enhancement of the TEI template for TR-Iüne 204-2 and the necessary adaptions of the XSLT as OsPoT2 were finalized by the author in late 2022.

2 For more information, please visit the CMO project page (CMO Project Page, n.d.) And the CMO source catalogue (CMO Source Catalogue, n.d.).

The present article will exemplify the TEI template as developed along the revision of the OsPoT XSLT and provide rationales for the chosen semantic markup in relation to the necessities of the digital scholarly edition.

A Brief Sketch of TEI

The origins of TEI, the Text Encoding Initiative, date back to a planning conference held in 1987 and formally started the following year (see TEI Historical Background, n.d.). The first consolidated work was TEI-P3 in 1994 (see Ide & Véronis, 1995), and with the creation of the TEI consortium in 2000, the maintenance and development were bundled in a non-profit organization; and in 2007, the current standard TEI-P5 was officially released.

TEI is an XML derivate, as its predecessor SGML. It is, therefore, also subject to the rule of well-formedness, i.e., it adheres to specific mark-up syntax of physical and logical structure. On top, schemas provide definitions of all TEI elements and attributes that govern their usage, i.e., their semantic markup, as expressed for example, in RelaxNG (n.d.). In addition, rule-based validation is structural and specifies the content model and usage constraints, i.e., the meaningfulness of TEI elements, for example, expressed in Schematron (n.d.). While the "XML tree", a series of nested elements within the XML root element, could be well-formed, having an element for a text line, for example, ancestral to one for a page, would not be meaningful and violate a defined schema as text cannot exist outside a physical carrier. The XML tree serializes and structures data in a hierarchical way. That also means that overlapping mark-up is not possible, but methods like stand-off mark-up relating different entities can be used instead (see Bańksi, 2010).

TEI comprises a core module and several topic-related modules, e.g. for prose and verses, topological descriptions, dictionaries, critical apparatuses, etc. These can – or have to – be combined according to the needs of the digital edition. The most basic template consists of the header, containing common metadata, and one or more text elements with the content of the encoded document itself. These text elements can further be divided into front face, main body, and back matter, whatever text these represent. Wherever appropriate, the document can set a variety of pointers, e.g. the target to an external resource or the reference to an internal identifier. That way, TEI has the potential to create a scalable network of information and interact with Linked Open Data (LOD) and the Semantic Web.

Digital Scholarly Editing with TEI

Today, TEI has become the *de facto* standard for digital scholarly editing in many philological areas and archival studies (see for example, Digitale Edition, n.d.), often creating customizations by specialized schemas, e.g., the well-known EpiDoc (n.d.) for ancient inscriptions and papyri, or the encoding of Maya hieroglyphic texts (Gronemeyer et al., 2020). Likewise, the development of a specialized schema for Ottoman poetry and sung lyrics by the CMO project contributes to the body of TEI conformant schemas. The DFG recommends the use of TEI-P5, admitting that "[t]he choice of the mark-up is generally dependent on the particular project" (DFG, 2016, p. 34), but encourages the use of specific schemas like the German Text Archive basic format (DTABf, n.d.) for larger interoperability. Such recommendations, however, focus on structured materials like codices, books, early prints, etc.; representing the layout and content of single sources or editions.

The critical text editions of CMO are less concerned with the actual manuscript description but with the comparison with other sources and, above all, certain information and parameters relevant to or in connection with the music to which these texts were sung. Some of this informa-

tion may be given in the textual form, like the musical genre, composer, *fasıl*, *makâm*, and *usûl* (see Plaksin & Olley, 2019, pp. 121-123); some need to be inferred, such as prosody and metric structures. The lyrics may be represented in block text divided into lines of hemistiches, *terennüm*, and performance instructions; or alternatively or in addition as underlay text of singular Arabic characters associated with certain notational symbols in Hampartsum.[3] Therefore, the schema requires a special focus on the verse module of TEI while being able to encode the characteristics of Ottoman art music. This makes the development of a TEI customization for this purpose also pioneering in the field of both Ottoman literary and musicological studies.

With the development and modeling of a data structure in TEI for a digital critical edition, CMO is, to some extent, following an internal paradigm shift. There will be "traditional" PDF editions in the future for easy printing or reading on mobile devices. But these should be considered as a narrowed, specialized format, following the assessment that "[a] digital edition is defined by the fact that it cannot be converted into a typographic form without significant loss of information and function – and in this sense goes beyond the printable edition" (Sahle, 2013, 2, p. 149, translation from German by the author). Of special importance in this digital paradigm, as defined by Sahle (2017) are: 1) openness, 2) scalability, 3) work in progress, 4) interlinearity, 5) multimodality, and 6) the data model as a research output in its own right. Especially the last aspect, in mutual relationship to the other points, is of importance: the DH specialist is no mere IT service provider but a (digital) humanist as well, seeking to answer research questions in an interdisciplinary team of specialists from other humanities.

In addition to the text edition of the sources itself, the entire digital edition will be interlinked with a variety of supporting documents, also modeled in TEI. For example, there are glossaries modeled after the dictionary module that provide definitions for a variety of terms used in the project.

The TEI Structure for a Critical Text Edition of Sung Ottoman Poetry

Any vocal piece of Ottoman art music in the digital scholarly text edition within the tei:TEI root element comprises of the two core modules tei:header and tei:text, the latter divided into the (block) lyrics represented by tei:body and the critical apparatuses within tei:back (Figure 1).[4]

```
<TEI xmlns="http://www.tei-c.org/ns/1.0">
   <teiHeader>[Header with file metadata]
   </teiHeader>
   <text>
      <body>[Lyrics including other written information related to a piece]
      </body>
      <back>[Critical apparatuses]
      </back>
   </text>
</TEI>
```

Figure 1: Basic TEI structure.

3 This was necessary because Hampartsum notation is written from left to right, hence disrupting the ligatures of Arabic as a right-to-left script.

4 A note on the conventions on TEI mark-up: in textual description, all elements from the XML tree are referred to with tei:elementName, the prefix "tei:" indicates the XML namespace, followed by the element name itself. Attributes of an element and their respective values providing additional information follow the scheme @attribute="value". In the code examples, elements appear in angle brackets without "tei:", attributes without the preceding "@" within the element mark-up, e.g. <elementName attribute="value">. Elements must have a closing </elementName> tag which may enclose so-called child nodes in the XML tree, unless they are a self-closed <emptyElement/> without further nodes. Additional colour-coding and indent facilitate human readability. Comments not part of the XML tree are marked <!-- this way -->. Abstract information on the content is put into [square brackets]. All code examples are included in <egXML></egXML>, except in Figure 1, as <TEI> is the document root element to define the namespace, thus it is a valid document against a schema and not just an XML-compliant snippet.

In the following pages, each of these sections will be explained with its abstract content model, and selected aspects within the model will be highlighted.

The Metadata in the Header Section

All metadata that is relevant to the digital text edition of a piece are recorded in the TEI header. Its tei:teiHeader element comprises of two child elements (Figure 2):

- tei:fileDesc with
  - o Title with information on poetic and musical parameters
  - o Original authors and modern editors
  - o Information on the digital edition and the whole series
  - o Related original sources with bibliographic information
- tei:encodingDesc with
  - o Application and version information
  - o Project description
  - o Metrical declarations

```
<egXML>
   <fileDesc>
      <titleStmt>[Title information, parameters, and authors/editors of a piece]
      </titleStmt>
      <editionStmt>[Type of edition]
      </editionStmt>
      <publicationStmt>[Specifics of edition]
      </publicationStmt >
      <seriesStmt>[Specifics of the series the edition is part of]
      </seriesStmt >
      <sourceDesc>[Information of sources related to the edited piece]
      </sourceDesc>
   </fileDesc>
   <encodingDesc>
      <variantEncoding>[Information on type and structure of critical apparatus]
      </variantEncoding>
      <!-- Repeatable. -->
      <appInfo>[Multilingual information on the creation of the TEI source]
      </appInfo>
      <!-- Repeatable. -->
      <projectDesc>[Multilingual information on the project's scope]
      </projectDesc>
      <!-- Repeatable. -->
      <editorialDecl>[Multilingual reference to the editorial guidelines]
      </editorialDecl>
      <tagsDecl>[Information on custom elements]
      </tagsDecl>
      <!-- Repeatable. -->
      <metDecl>[Information on metrical patterns]
      </metDecl>
   </encodingDesc>
</egXML>
```

Figure 2: The basic elements of the TEI header.

The Title Statement

In tei:titleStmt, general metadata related to the title and the piece are recorded (Figure 3). This includes information normally written down in the original, such as the title, the *makâm*, and *usûl;* as well as other musical and lyrical parameters. This information facilitates indexing and

also provides cross-references to glossaries. It is grouped as one title, as there may be pieces with the same title written in the original source but with different lyrics. The author(s) of the original piece and the editor(s) having created the current (digital) edition are complementing information. Not all of the information needs to be provided here if not written out in the source or reconstructable.

```
<egXML>
   <titleStmt>
      <title type="desc">
         <title type="titleTranscription" xml:lang="[ISO_639-3]">[Title]</title>
         <note type="genreTranscription" xml:lang="[ISO_639-3]">
            <ref target="[URL]">[Genre]</ref>
         </note>
         <note type="makamTranscription" xml:lang="[ISO_639-3]">[Makâm]</note>
         <!-- Option 1: The usûl is written down in source. -->
         <note type="usulTranscription" xml:lang="[ISO_639-3]">
            <ref target="[URL]">[Usûl]</ref>
         </note>
         <!-- Option 2: The usûl is incorrect or absent from source. -->
         <note type="usulStandardized" xml:lang="[ISO_639-3]">
            <ref target="[URL]">
               <supplied reason="provided-by-editor" cert="[0-1]"
               resp="#[ID]">[Usûl]</supplied>
            </ref>
         </note>
         <!-- Deletable. -->
         <note type="poeticForm" xml:lang="[ISO_639-3]">
            <ref target="[URL]">
               <supplied reason="provided-by-editor" cert="[0-1]"
               resp="#[ID]">[Poetic form]</supplied>
            </ref>
         </note>
         <!-- Deletable. -->
         <note type="poeticGenre" xml:lang="[ISO_639-3]">
            <ref target="[URL]">
               <supplied reason="provided-by-editor" cert="[0-1]"
               resp="#[ID]">[Poetic genre]</supplied>
            </ref>
         </note>
         <!-- Repeatable together with the following element. -->
         <note type="bahir" xml:lang="[ISO_639-3]" corresp="#[ID]">
            <ref target="[URL]">
               <supplied reason="provided-by-editor" cert="[0-1]"
               resp="#[ID]">[Bahir]</supplied>
            </ref>
         </note>
         <note type="meter" xml:lang="[ISO_639-3]" corresp="#[ID{1,4}]">
            <supplied reason="provided-by-editor" cert="[0-1]"
            resp="#[ID]">[Feet, 1-4 times]</supplied>
         </note>
         <idno>[RISM ID, piece and page number]</idno>
      </title>
      <!-- Repeatable. -->
      <author role="[role]" cert="[0-1]" resp="#[ID]">
         <persName ref="[URL]">[Name]</persName>
      </author>
      <!-- Repeatable. -->
      <editor role="[role]" corresp="#[ID]">[Name]</editor>
   </titleStmt>
</egXML>
```

Figure 3: Overview of the structure of the title statement.

The title itself usually precedes a piece (whether it is given in block and/or underlay lyrics) and is always provided in a transcribed form (Figure 4): tei:title[@type="titleTranscription"]. Apart from the writing system used (e.g. Ottoman Turkish in Arabic, Armenian, Greek, or Hebrew alphabets), the language is also specified by @xml:lang and a three-letter code following the ISO 639-3 standard (ISO 639-3, n.d.) and is usually "ota" for "Ottoman Turkish", for example:[5]

```
<egXML source="#NE204pc49">
   <title type="titleTranscription" xml:lang="ota">Beste çenber İsaḳ</title>
</egXML>
```

Figure 4: Example of a transcribed piece title.

The musical genre is usually part of the title and is added in a transcribed form via a tei:note[@type="genreTranscription"] element (Figure 5). It includes a tei:ref element to provide a link to a glossary file explaining the characteristics of the musical genre as defined by the project, for example:

```
<egXML source="#NE204pc49">
   <note type="genreTranscription" xml:lang="ota">
      <ref target="genreGlossary#beste">Beste</ref>
   </note>
</egXML>
```

Figure 5: Example of the musical genre in transcription.

The *makâm* or at least the *makâm* group *(fasıl)* usually accompanies the title and is provided by tei:note[@type="makamTranscription"] (Figure 6). Since the *makâm* is a very fluid concept, it is not provided with a specific glossary. The *usûl* is provided in the same manner with tei:note[@type="usulTranscription"].

```
<egXML source="#NE204pc49">
   <note type="makamTranscription" xml:lang="ota">Dil-keş Ḥāverān</note>
</egXML>
```

Figure 6: Example of a *makâm* in transcription.

In a few instances, the *usûl* noted by the scribe does not actually fit the *usûl* that has been inferred by the music editor from the notation, or it is not explicitly stated in the title. In this case, tei:supplied[@reason="provided-by-editor"] is inserted (Figure 7). The confidence in the reconstruction is a numeric value for @cert[6], and the responsible editor is referenced by his/her two-letter ID with @resp (as defined below in tei:seriesStmt/tei:respStmt), in the current example C. Ersin Mıhçı.

5 In real code examples, @source always provides reference to the source, e.g., "NE204pc49" is piece 49 from manuscript TR-Iüne 204-2 (NE204).
6 The values are disjunct values between 0 and 1 with certain meanings that are defined in the accompanying RelaxNG schema for validation.

```
<egXML source="#NE204pc144">
   <title type="titleTranscription" xml:lang="ota">Semāʿī Ḥāfıẓ Rifʿat</title>
   <note type="usulStandardized" xml:lang="ota">
      <ref target="usulGlossary.xml#semai">
         <supplied reason="provided-by-editor" cert="1" resp="#CM">Aksak
         semâî</supplied>
      </ref>
   </note>
</egXML>
```

Figure 7: Example of a reconstructed *usûl* in standardized orthography.

The poetic form and genre can only sometimes be inferred by the text editor (in the example below Neslihan Demirkol); therefore, the information is always marked with a tei:supplied element (Figure 8). As the poetic form and genre are based on common terms, they can be linked with tei:ref to a glossary (see further below for the corresponding example). The attributes and values are the same as with the other elements of the same structure.

```
<egXML source="#NE204pc78">
   <note type="poeticForm" xml:lang="ota">
      <ref target="poeticGlossary.xml#gazel">
         <supplied reason="provided-by-editor" cert="1" resp="#ND">Gazel</supplied>
      </ref>
   </note>
</egXML>
```

Figure 8: Example of a reconstructed poetic form.

Information on the prosodic structure (Figure 9) is encoded in two tei:note elements with @type=”bahir” and @type=”meter”. The *bahir* is historically the standard prosodic meter that consists of three or four feet of one to five short or long syllables (Andrews, 1976, pp. 26-27). However, especially in Ottoman classical poetry, they serve to categorize *vezin*s (fixed meter patterns). Each *vezin* is indicated here by numbers following the name of the *bahir*, e.g. *Hezec* 1, *Hezec* 2, etc. All feet are traditionally represented by mnemonic words called *tef’ile* that correlate with the distribution of short and long syllables, e.g. *fâ’ilâtün, fâ’ilün, mef’ûlü, müstef’ilün.*

Each individual vezin and its consisting feet are defined by tei:metSym elements within the tei:encodingDesc (see Figures 22-24). Their canonical pattern is referred to by the value of the respective @corresp attribute, and the corresponding text refers to the *bahir* and provides the feet structure.

```
<egXML source="#NE204pc49">
   <note type="bahir" xml:lang="ota" corresp="#remel2">
      <ref target="bahirGlossary.xml#remel">
         <supplied reason="provided-by-editor" cert="1" resp="#ND">Remel</supplied>
      </ref>
   </note>
   <note type="meter" xml:lang="ota" corresp="#feilatun #feilatun #feilatun
   #feilun">
      <supplied reason="provided-by-editor" cert="1" resp="#ND">Fe’ilâtün /
      fe’ilâtün / fe’ilâtün / fe’ilün</supplied>
   </note>
</egXML>
```

Figure 9: Example of information on the prosodic structure with *bahir* and *vezin*.

The last element in tei:title[@type="desc"] specifies the piece by its preferred RISM (n.d.) identifier (Figure 10), the piece number in the source, and the page number the lyrics start on.

```
<egXML source="#NE204pc49">
   <idno>TR-Iüne 204-2, Piece no. 49, Ms. page no. 65</idno>
</egXML>
```

Figure 10: Example of a piece identified by its RISM title.

Following the title information, the original author(s) is/are provided (Figure 11). In virtually all cases, at least the composer of a piece is known, but not always the lyricist(s). Together with the tei:author element, the contribution of an individual is specified by the @role attribute, and the confidence that the person named is the one that actually created the music or the lyrics is given by @cert. In the example below, the lyricist has @cert="0.5" because Hâmî could either refer to the individual Hâmî Ahmed Âmidî (considered as more likely) by the editor(s), or Mehmed Kâmî Efendi. The editor responsible for the attribution is again given by her/his ID as the value of @resp.

The standardized name itself is contained in a tei:persName element, and in case the individual of this name has a record in the CMO source catalog, it is linked via @ref. In this way, each contributor to an original piece can be represented with individual vagueness.

```
<egXML source="#NE204pc49">
   <author role="composer" cert="1" resp="#ND">
      <persName ref="https://corpus-musicae-ottomanicae.de/receive/
      cmo_person_00000292">Tanbûrî İsak</persName>
   </author>
   <author role="lyricist" cert="0.5" resp="#ND">
      <persName ref="https://corpus-musicae-ottomanicae.de/receive/
      cmo_person_00000081">Hâmî</persName>
   </author>
</egXML>
```

Figure 11: Example with information on composer and lyricist.

Finally, the editor(s), who created and participated in the edition of the text (not necessarily the digital edition), are provided by the tei:editor element with their share in the edition (Figure 12), specified by @role. Using @corresp, the editor(s) involved, as long as they are/were members of the project team, are referred to by their ID, linking to a more detailed record in tei:seriesStmt/tei:respStmt. Otherwise, third-party persons are simply provided with their kind of participation. In the example of Figure 12, Saeedeh Setayesh supported this individual piece in terms of Persian lyrics only.

```
<egXML source="#NE204pc78">
   <editor role="author" corresp="#ND">Dr. Neslihan Demirkol</editor>
   <editor role="contributor" corresp="#MS">Dr. Malek Sharif</editor>
   <editor role="contributor">Saeedeh Setayesh</editor>
</egXML>
```

Figure 12: Example of persons involved in the (digital) text edition.

The Edition Statement

The following tei:editionStmt groups all editorial information and general metadata related to the current text edition itself. This includes the institutional bodies involved (namely the DFG

and the University of Münster), the actual editors, their affiliations, and references to norm data on the persons involved. For each manuscript and edition, this is static content unless a revised version or a new text-critical edition is created.

```
<egXML>
   <editionStmt>
      <edition>[Edition]</edition>
      <!-- Repeatable. -->
      <funder ref="[URL]">[Name of body]</funder>
      <!-- Repeatable. -->
      <sponsor ref="[URL]">[Name of body]</sponsor>
      <respStmt>
         <resp key="ged">General Editor</resp>
         <!-- Repeatable. -->
         <name>
            <persName corresp="#[ID]" ref="[URL]">[Name]</persName>
            <affiliation>[Name of body]</affiliation>
         </name>
      </respStmt>
      <respStmt>
         <resp key="edi">Editors</resp>
         <!-- Repeatable. -->
         <name>
            <!-- Option 1: Current team member. -->
            <persName corresp="#[ID]" ref="[URL]">[Name]</persName>
            <!-- Option 2: Former team member. -->
            <persName xml:id="[ID]" ref="[URL]">[Name]</persName>
         </name>
      </respStmt>
   </editionStmt>
</egXML>
```

Figure 13: Overview of the structure of the edition statement.

The two tei:respStmt group the responsibilities for the edition (Figure 14), the general editor(s) and the text editor(s). The kind of responsibility is recorded in the @key attribute, with a three-letter code that follows the MARC code list for relators (MARC, n.d.) that is generally used throughout the TEI templates. Each individual is provided with their name and affiliation, realised as tei:name/tei:persName and tei:name/tei:affiliation. The tei:persName element may take two elements, @corresp with an ID referred to in tei:seriesStmt/tei:respStmt, if the person is a current team member. Via @ref, linking to a norm data repository, preferably the GND (n.d.), is established.

```
<egXML source="#NE204">
   <respStmt>
      <resp key="edi">Editors</resp>
      <name>
         <persName corresp="#ND" ref="https://orcid.org/0000-0002-8602-1704">
         Dr. Neslihan Demirkol</persName>
      </name>
      <name>
         <persName xml:id="MS" ref="https://explore.gnd.network/gnd/106049969X">
         Dr. Malek Sharif</persName>
      </name>
   </respStmt>
</egXML>
```

Figure 14: Example of the text editors involved in the edition.

The Publication Statement

The next block of information in the TEI header concerns the publication and distribution of the digital edition (Figure 15), namely the institutional bodies as well as the license (under Creative Commons) and year and place of publication. For each manuscript and edition, this is static content.

```
<egXML>
   <publicationStmt>
      <!-- Repeatable. -->
      <publisher>[Publisher]</publisher>
      <!-- Repeatable. -->
      <distributor>[Website]</distributor>
      <date>[Year]</date>
      <pubPlace>[Place]</pubPlace>
      <availability>
         <licence target="[URL]">[Licence]</licence>
      </availability>
   </publicationStmt>
</egXML>
```

Figure 15: Overview of the structure of the publication statement.

The Series Statement

```
<egXML>
   <seriesStmt>
      <title>Corpus Musicae Ottomanicae</title>
      <respStmt>
         <resp key="edc">Editor of Digital Corpus</resp>
         <name xml:id="CMO">
            <orgName xml:lang="en">Corpus Musicae Ottomanicae, Research Center of
            the German Research Foundation at the University of Münster, Institute
            of Musicology.</orgName>
         </name>
      </respStmt>
      <respStmt>
         <resp key="oth">Cooperation Partners</resp>
         <!-- Repeatable. -->
         <name xml:id="[ID]">
            <orgName>[Name]</orgName>
            <!-- Repeatable or deletable. -->
            <idno xml:base="[URL]" type="[Repository]">[ID]</idno>
         </name>
      </respStmt>
      <respStmt>
         <resp key="pdr">Project Director</resp>
         <!-- Repeatable. -->
         <name xml:id="[ID]">
            <persName>[Name]</persName>
            <affiliation corresp="#CMO"/>
            <!-- Repeatable or deletable. -->
            <affiliation>[Name]</affiliation>
            <!-- Deletable. -->
            <idno xml:base="[URL]" type="[Repository]">[ID]</idno>
         </name>
      </respStmt>
      <respStmt>
         <resp key="[MARC_Relator_Code]">[Role]</resp>
         <name xml:id="[ID]">
            <persName>[Name]</persName>
            <affiliation corresp="#[ID]"/>
            <!-- Repeatable or deletable. -->
            <affiliation>[Name]</affiliation>
            <!-- Repeatable or deletable. -->
            <idno xml:base="[URL]" type="[Repository]">[ID]</idno>
         </name>
      </respStmt>
   </seriesStmt>
</egXML>
```

Figure 16: Overview of the structure of the series statement.

In the tei:seriesStmt, all institutional bodies and the individuals belonging to them that are responsible for the digital editions as a whole are listed (Figure 16). The whole series receives a title and an institutional editor, and persons in certain roles. The project includes every current team member at the point of creation, independent from the role or organisational affiliation or the individual contribution to the series as a whole.

In the different tei:respStmt elements, each tei:name element receives a @xml:id with a certain two- or three-letter code. For individuals, this is the same ID that is referenced by @resp throughout the document in other elements, e.g., tei:supplied. For organizational bodies, the @xml:id value serves to identify the project-internal affiliation of persons, while external relations are also possible (Figure 17):

```
<egXML source="#NE204">
   <respStmt>
      <resp key="oth">Cooperation Partners</resp>
      <name xml:id="MWS">
         <orgName>Max Weber Stiftung</orgName>
         <idno xml:base="https://explore.gnd.network/gnd/" type="GND">
         1028661126</idno>
      </name>
   </respStmt>
   <respStmt>
      <resp key="oth">Research Managers Digital Editions and Data Management</resp>
      <name xml:id="SG">
         <persName>Sven Gronemeyer</persName>
         <affiliation corresp="#MWS"/>
         <affiliation>La Trobe University, Melbourne</affiliation>
         <idno xml:base="https://explore.gnd.network/gnd/" type="GND">
         1155600487</idno>
         <idno xml:base="https://orcid.org/" type="ORCID">
         0000-0002-9066-0461</idno>
      </name>
   </respStmt>
</egXML>
```

Figure 17: Example of the use of personal IDs and affiliations.

The Source Description and List of Related Witnesses

As mentioned above, the contents of the tei:sourceDesc section is crucial for the critical apparatus. All individual sources related to the piece are listed with their bibliographic information. The first in tei:sourceDesc is always dedicated to the source where the current piece appears, followed by all other sources mentioned in the apparatus. The information is congruent with those stored in the CMO source catalog and originates from it. For manuscript TR-Iüne 204-2, the information is automatically retrieved by the OsPoT2 framework via an API from the source catalog. Its data model is based on the Music Encoding Initiative (MEI, n.d.) because one of its modules natively supports the Functional Requirements for Bibliographic Records standard (FRBR, n.d.). For example, the bibliographic information for TR-Iüne 204-2 appears in the format as shown in Figure 18:

```
<egXML>
   <meiContainer inherited="0">
      <mei:manifestation xmlns:mei="http://www.music-encoding.org/ns/mei"
      xmlns:cmo="http://www.corpus-musicae-ottomanicae.de/ns/cmo">
         <identifier xmlns="http://www.music-encoding.org/ns/mei"
         type="CMO">NE204</identifier>
         <identifier xmlns="http://www.music-encoding.org/ns/mei"
         type="RISM">TR-Iüne 204-2</identifier>
         <physLoc xmlns="http://www.music-encoding.org/ns/mei">
            <repository>
               <geogName>
                  <geogName type="country">Turkey</geogName>
                  <geogName type="city">Istanbul</geogName>
               </geogName>
               <corpName type="library">İstanbul Üniversitesi Nadir Eserler
               Kütüphanesi</corpName>
               <identifier type="shelfmark">Y. 204-2</identifier>
            </repository>
         </physLoc>
         <mei:history>
            <eventList xmlns="http://www.music-encoding.org/ns/mei">
               <event>
                  <head>Origination</head>
                  <geogName>Istanbul?</geogName>
                  <date notbefore="1880" notafter="1920" calendar="gregorian">
                  After ca. 1880</date>
               </event>
            </eventList>
         </mei:history>
         <langUsage xmlns="http://www.music-encoding.org/ns/mei">
            <language xml:id="ota-arab" auth="iso15924">
            iso15924:ota-arab</language>
         </langUsage>
         <contents xmlns="http://www.music-encoding.org/ns/mei">
            <p>Collection of instrumental and vocal music in Ottoman Turkish dating
            from late nineteenth or early twentieth century.</p>
         </contents>
         <mei:classification>
            <mei:termList class="https://www.corpus-musicae-ottomanicae.de/api/v1/
            classifications/cmo_sourceType">
               <mei:term>Manuscript</mei:term>
            </mei:termList>
            <mei:termList class="https://www.corpus-musicae-ottomanicae.de/api/v1/
            classifications/cmo_kindOfData">
               <mei:term>source</mei:term>
            </mei:termList>
            <mei:termList class="https://www.corpus-musicae-ottomanicae.de/api/v1/
            classifications/cmo_notationType">
               <mei:term>Hampartsum_notation</mei:term>
            </mei:termList>
            <mei:termList class="https://www.corpus-musicae-ottomanicae.de/api/v1/
            classifications/cmo_contentType">
               <mei:term>Mixed_musical_collection</mei:term>
            </mei:termList>
         </mei:classification>
      </mei:manifestation>
   </meiContainer>
</egXML>
```

Figure 18: FRBR-compliant MEI modeling of the metadata of TR-Iüne 204-2 in the source catalog.

As TEI does not support the FRBR standard, the data need to be mapped. This may produce an overhead of elements, but these are mandatory according to the TEI scheme, even if they may be empty, e.g., if a manuscript has no author, a proper title, and, of course, a publisher. Therefore, instead of providing the full, lengthy abstract data model (which on the top level is similar to the TEI header), the actual example of the above manuscript is given. Although MEI draws on the same principles of TEI standard, some elements describing the same have different names, or

elements with the same name mean something different.[7] The mapping is automatically created by the OsPoT2 XSLT and yields the result shown in Figure 19 for the corresponding tei:witness element contained in tei:listWit that groups all individual text witnesses.

```
<egXML>
   <listWit>
      <witness xml:id="cmo_source_00000030">
         <idno type="CMO">NE204</idno>
         <idno type="RISM">TR-Iüne 204-2</idno>
         <biblFull>
            <fileDesc>
               <titleStmt>
                  <title/>
                  <author/>
               </titleStmt>
               <publicationStmt>
                  <ab/>
               </publicationStmt>
               <sourceDesc>
                  <bibl>Source description originates from CMO Source Catalogue:
                     <ref type="uri">https://corpus-musicae-ottomanicae.de/receive/
                     cmo_source_00000030</ref>
                  .</bibl>
               </sourceDesc>
            </fileDesc>
            <profileDesc>
               <textClass>
                  <keywords>
                     <term target="https://www.corpus-musicae-ottomanicae.de/api/
                     v1/classifications/cmo_sourceType#Manuscript"
                     type="cmo_sourceType">Manuscript</term>
                     <term target="https://www.corpus-musicae-ottomanicae.de/api/
                     v1/classifications/cmo_kindOfData#source"
                     type="cmo_kindOfData">Source Catalogue</term>
                     <term target="https://www.corpus-musicae-ottomanicae.de/api/
                     v1/classifications/cmo_notationType#Hampartsum_notation"
                     type="cmo_notationType">Hampartsum notation</term>
                     <term target="https://www.corpus-musicae-ottomanicae.de/api/
                     v1/classifications/cmo_contentType#Mixed_musical_collection"
                     type="cmo_contentType">Mixed musical collection</term>
                  </keywords>
               </textClass>
               <langUsage>
                  <language ident="ota-Arab">Ottoman Turkish in Arabic
                  script</language>
               </langUsage>
            </profileDesc>
         </biblFull>
         <msDesc>
            <msIdentifier>
               <country>Turkey</country>
               <settlement>Istanbul</settlement>
               <repository>İstanbul Üniversitesi Nadir Eserler Kütüphanesi
               </repository>
               <idno>Y. 204-2</idno>
            </msIdentifier>
            <msContents>
               <summary>Collection of instrumental and vocal music in Ottoman
               Turkish dating from late nineteenth or early twentieth century.
               </summary>
            </msContents>
            <history>
               <p>Origination:
                  <geogName>Istanbul?</geogName>
                  <date notBefore="1880" notAfter="1920" calendar="#gregorian">
                  After ca. 1880</date>
               </p>
            </history>
         </msDesc>
      </witness>
   </listWit>
</egXML>
```

Figure 19: The metadata for TR-Iüne 204-2 mapped in TEI.

7 For example, the tei:note element, as e.g. used in the TEI header is used for text annotations. In a musical context, mei:note obviously has a completely different meaning.

The Encoding Description

The last element in the TEI header is tei:encodingDesc with information on the software, custom content and on editorial guidelines and a project description (Figure 20).

```
<egXML>
   <encodingDesc>
      <variantEncoding>[Information on type and structure of critical apparatus]
      </variantEncoding>
      <!-- Repeatable. -->
      <appInfo>[Multilingual information on the creation of the TEI source]
      </appInfo>
      <!-- Repeatable. -->
      <projectDesc>[Multilingual information on the project's scope]
      </projectDesc>
      <!-- Repeatable. -->
      <editorialDecl>[Multilingual reference to the editorial guidelines]
      </editorialDecl>
      <tagsDecl>[Information on custom elements]
      </tagsDecl>
      <!-- Repeatable. -->
      <metDecl>[Information on metrical patterns]
      </metDecl>
   </encodingDesc>
</egXML>
```

Figure 20: Overview of the structure of the encoding description.

For the sake of comprehensiveness, only two sub-sections relevant to the text edition will be explained in further detail. The definition of the critical apparatus is encoded in tei:variantEncoding as a single, self-closed element (Figure 21). Per default, the critical apparatus is encoded with @method="double-end-point" which means that the "apparatus indicates the precise locations of the beginning and ending of each lemma relative to a base text." Therefore, the apparatus will always be separated from the base text, as indicated by @location="external".

```
<egXML>
   <variantEncoding method="double-end-point" location="external"/>
<egXML>
```

Figure 21: Mark-up for the type of critical apparatus.

The tei:metDecl sections detail several levels of encoding metrical units and patterns that are referenced in different elements within tei:div[@type="blockLyricsTranscription"] for the lyrics and also in tei:titleStmt/tei:title/tei:note[@type="bahir"] and tei:titleStmt/tei:title/tei:note[@type="meter"] for the metadata.

The definition of the basic metrical units and their corresponding symbols (Figure 22) is the foundation for any further markup of metrical information in the digital edition of Ottoman poetry. It is a standard set of symbols for syllable length, processes changing any higher syllabic structure, and a structural sign to indicate a division in higher syllabic structures.

```
<egXML>
   <fileDesc>
      <titleStmt>[Title information, parameters, and authors/editors of a piece]
      </titleStmt>
      <editionStmt>[Type of edition]
      </editionStmt>
      <publicationStmt>[Specifics of edition]
      </publicationStmt >
      <seriesStmt>[Specifics of the series the edition is part of]
      </seriesStmt >
      <sourceDesc>[Information of sources related to the edited piece]
      </sourceDesc>
   </fileDesc>
   <encodingDesc>
      <variantEncoding>[Information on type and structure of critical apparatus]
      </variantEncoding>
      <!-- Repeatable. -->
      <appInfo>[Multilingual information on the creation of the TEI source]
      </appInfo>
      <!-- Repeatable. -->
      <projectDesc>[Multilingual information on the project's scope]
      </projectDesc>
      <!-- Repeatable. -->
      <editorialDecl>[Multilingual reference to the editorial guidelines]
      </editorialDecl>
      <tagsDecl>[Information on custom elements]
      </tagsDecl>
      <!-- Repeatable. -->
      <metDecl>[Information on metrical patterns]
      </metDecl>
   </encodingDesc>
</egXML>
```

Figure 22: Definition of the symbols used in the description of any metrical unit.

The tei:metDecl[@xml:id="symbols"] defines the basic symbols related to scansion (Figure 22). The value for @pattern is a regular expression. It is kept in the most basic form to be applicable to all higher metrical structures. It defines that each basic symbol except the foot division may appear 1 to 5 times before a foot division to constitute the foot as the higher metrical unit and that each foot (including the division sign) may appear 1 to 4 times in the next higher metrical unit, the *vezin*.

Apart from higher metrical units defined as canonical structures in additional tei:metDecl[@corresp="#symbols"] (see below), these values are only referenced in tei:l[@real] if the actual structure is deviant from the standard structure in any lyrics line of sung poetry (see below).

Next, follow the declarations for the 18 known feet consisting of 1 to 5 individual syllables, short or long (Figure 23). They reference the standard symbols by @corresp="#symbols" and identify the feet structure as the standard forms by @type="met". Only the feet actually in use in a specific piece of sung poetry are included in this section.

```
<egXML source="#NE204pc49">
   <metDecl xml:id="feet" corresp="#symbols" type="met">
      <metSym xml:id="feilatun" value="fe'ilâtün" terminal="false">uu--|</metSym>
      <metSym xml:id="feilun" value="fe'ilün" terminal="false">uu-|</metSym>
   </metDecl>
<egXML>
```

Figure 23: Example of the definition of the feet used in a single piece.

The tei:metSym[@xml:id] here provides an ASCII-compliant identifier for the name of the individual foot, while tei:metSym[@value] gives the name in modern Turkish. The former is used in tei:titleStmt/tei:title/tei:note[@type=”meter”] to refer the metadata to the feet.

Finally, the declarations of the hitherto 31 identified vezins follow (Figure 24). They reference the standard symbols by @corresp=”#symbols” and identify them as the standard forms by @type=“met”. Only the *vezin*(s) actually in use in a specific piece of sung poetry is/are included in this section.

```
<egXML source="#NE204pc78">
   <metDecl xml:id="vezin" corresp="#symbols" type="met">
      <metSym xml:id="hezec4" value="Hezec 4" terminal="false">u---|u--|u---|u--|
      </metSym>
      <metSym xml:id="muzari2" value="Muzâri 2" terminal="false">--u|-u-u|--u|-u--|
      </metSym>
      <metSym xml:id="remel1" value="Remel 1" terminal="false">-u--|-u--|-u--|-u-|
      </metSym>
   </metDecl>
<egXML>
```

Figure 24: Example of the definition of the *vezin*s used in a single piece.

The tei:metSym[@xml:id] here provides an ASCII-compliant identifier for the name of the individual foot, originating from Arabic, while tei:metSym[@value] gives the name in scientific transliteration; in both cases, an integer is added as an internal identifier to identify each vezin of a bahir. While tei:titleStmt/tei:title/tei:note[@type=”bahir”] (Figure 9) only provides the name of the bahir, the element’s @corresp links to the *vezin* defined in this tei:metDecl.

The Critical Text Edition

The critical text edition is recorded in the tei:text part of the document and contains two child elements (Figure 25):

- tei:body with
  - o Information on identifying the manuscript and the individual piece
  - o The edited text of block lyrics transcribed and/or reconstructed from an Ottoman Turkish source in the Arabic alphabet
  - o Structural information of the lyrics in terms of their text type
  - o Notes on the lyricist(s)
  - o Inline text anchors to the critical apparatus
- tei:back with
  - o Information in which sources the lyrics are found
  - o Reading alterations
  - o General notes on the lyrics and their author(s)

To distinguish the different elements within tei:body and tei:back in terms of their function and content, each one is specified with a certain @type attribute and possibly other, sometimes mandatory, attributes.

```
<egXML>
   <body>
      <div type="pieceNewStart">[Information and identifiers on the piece
      preceding its music/lyrics]
      </div>
      <!-- Option 1: Block lyrics are present. -->
      <div type="blockLyricsTranscription" xml:lang="ota" style="direction:ltr;">
      [The lyrics as transcribed from source]
      </div>
      <!-- Option 2: Block lyrics are absent. -->
      <div type="blockLyricsReconstructed" xml:lang="ota" style="direction:ltr;">
      [The lyrics as reconstructed from other source(s)]
      </div>
      <note type="lyricist">[Information on lyricist(s)]
      </note>
   </body>
   <back>
      <div type="provenance">[List of other witnesses containing the piece]
      </div>
      <div type="readings">[Text passages with other wording in a specific source]
      </div>
      <div type="annotations">[Information on the lyricist]
      </div>
   </back>
</egXML>
```

Figure 25: Overview of the structure of the lyrics and critical apparatuses.

Information Related to the Beginning of a Piece

In the first tei:div[@type=”newPieceStart”], all information that is relevant to locate and identifying a single piece in any given manuscript is recorded (Figure 26). The contents of this section deal with a certain bias: to provide information as close as possible as in the original manuscript, but also to harmonize differences between individual sources in one TEI template. This will not always be possible, but generally, many manuscripts follow a generic structure. So, besides a general structure, there is room for an optional, individual arrangement of elements.

```
<egXML source="#NE204pc78">
   <div type="newPieceStart">
      <milestone unit="cite" type=" #cmo_mods_00000570"/>
      <msDesc>
         <msIdentifier>
            <idno> TR-Iüne 204-2</idno>
         </msIdentifier>
         <msContents>
            <msItem n="78">
               <locus from="101" to="102">p. 101</locus>
               <rubric type="pieceNumber" subtype="red-pencil">78</rubric>
               <incipit>
                  <supplied reason="derived-from-lyrics" cert="1" resp="#ND">
                  Güẕeşt ārzū ez-ḫad be-pāy-ı būs-i tū mā-rā</supplied>
               </incipit>
            </msItem>
         </msContents>
      </msDesc>
   </div>
</egXML>
```

Figure 26: Example of information related to the start of a piece in a source.

The tei:milestone element is used to reinforce the separation of any manuscript into different pieces; the mandatory @unit to indicate the range of the element always has the value "cite" to refer to the printed critical edition, likewise divided into individual PDF files for each piece. Accordingly, the value of @source refers to the URL part with the unique identifier pointing to the document.

The following information refers to a specific part of the manuscript, i.e., an individual piece marked up by the tei:msItem element and identified by an integer in @n. Following the TEI guidelines, this element needs to be contained within tei:msDesc/tei:msContents, paired with a preceding tei:msDesc/msIdentifier. The latter element contains tei:idno to provide an identifier of the source itself, given here by its RISM identifier, as in the same element in tei:titleStmt/tei:title in the header section.

Within tei:msItem, specifics for an individual piece are noted. The physical placement of a piece is described with tei:locus, providing a page number, as in the header in tei:titleStmt/tei:title/tei:idno. The exact page range (especially for pieces spanning across two or more pages) is given in @from and @to. The tei:rubric can be used in a variety of ways, specified by @type and @subtype, depending on the information actually written in any source or with any piece, being designed to cover versatile information.

A piece cannot be distinguished from another solely by written captions, such as the title or *usûl*, as other distinguishing marks might be unwritten in any given source, such as the *makâm* or the incipit. For example, in TR-Iüne 204-2, there are two pieces entitled "Beste çenber İsa' ", both attributed to the same composer, both with the same *usûl*. However, the two have different *makâm*, and different lyrics. While TR-Iüne 204-2 provides the *makâm*, the incipit is not deliberately written. But as TR-Iüne 204-2 contains block lyrics, the incipit can easily be inferred from the first or first two lines of lyrics (so one hemistich is provided). In such cases, a tei:supplied element with appropriate attributes is provided within tei:incipit, given the source of the incipit with @reason, the plausibility with @cert, and the initials of the editor with @resp.

In the example given, tei:rubric indicates that the piece number is written out with a red pencil (in other manuscripts, @subtype might be absent, but tei:supplied added). The incipit of the piece is provided with absolute certainty (as written out in the block lyrics), hence also the value of @reason, the "derivation" is even more true in this case, as the first two lines read "āh **Güẕeşt ārzū ez-ḥad** āhā āhā serv-i nāz **be-pāy-ı būs-i tū mā-rā** cānım", one case, where sung poetry (bold) is mixed with *terennüm*, not part of the lyrics and therefore the incipit.

In the following tei:div[@type="blockLyricsTranscription"] or tei:div[@type="blockLyricsReconstructed"], respectively, all information about the (block) lyrics of a specific piece is marked up.

At this point, it must be emphasised once again that the TEI documents do not describe the primary sources subject to critical edition, but are the representation of a critical edition that has already taken place. This naturally has an impact on the modeling and rendition of the text structure, as it has already been interpreted by an editor. In manuscript TR-Iüne 204-2, for example, the most basic pieces have an original layout, as shown in Figure 27.

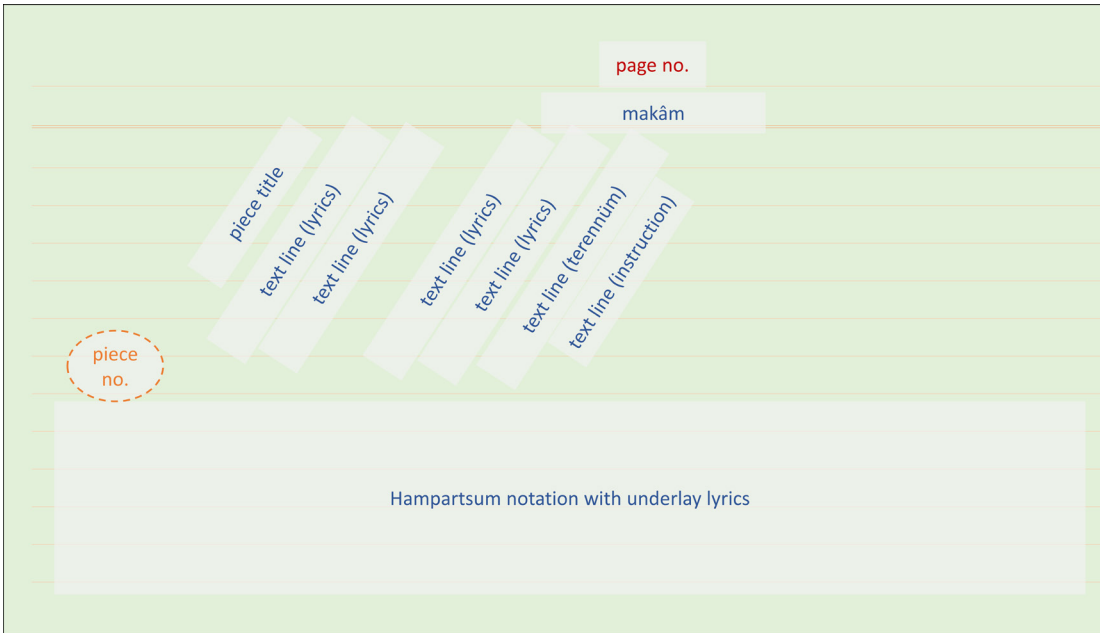

Figure 27: Schematic layout of the lyrics of TR-Iüne 204-2, piece 49.

The page number, piece number and the first lyrics line are part of the tei:div[@ type="pieceNewStart"], while *makâm* and piece title are part of the tei:header. The text lines can be distinguished by their content (lyrics, *terennüm*, and performance instructions), and can be grouped, and, as in the above example, one poem may be visually separated into two distiches with a larger space between the lines. A few pieces may have more than one hemistich, so the lyrics can formally be divided into more than one line group of lyrics with "attached" *terennüm* parts, although these are not part of the lyrics from a literary studies point of view (Figure 28).

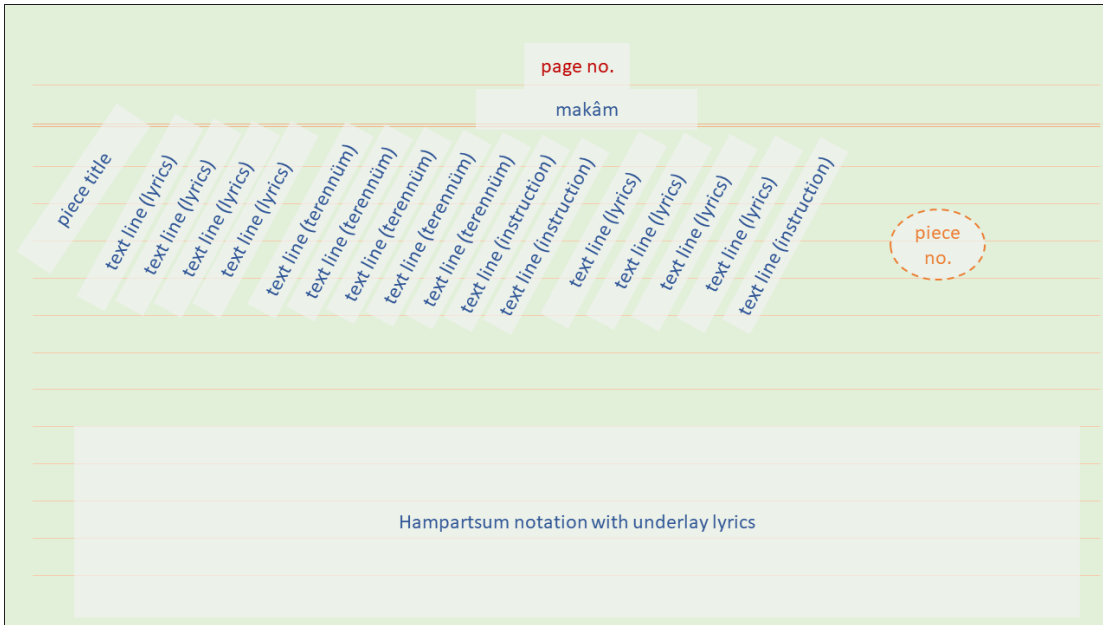

Figure 28: Schematic layout of the lyrics of TR-Iüne 204-2, piece 99.

This leads to the general structure shown in Figure 29, which also includes the lyricist regularly not mentioned in a piece.

```
<egXML>
   <div type="blockLyricsTranscription" xml:lang="ota" style="direction:ltr;">
      <!-- Repeatable. -->
      <head n="[1-n]">[Piece title]
      </head>
      <!-- Repeatable. -->
      <lg n="[1-n]" decls="[ID]" rhyme="[Pattern]">
         <!-- Repeatable. -->
         <l n="[1-n]">
            <!-- Combinable and repeatable. -->
            <!-- Option 1: Sung text. -->
            <seg type="vocal" ana="[Text_type]">[Written line of text]
            </seg>
            <!-- Option 2: Instructive / informative text. -->
            <stage type="[Non_verbal]" ana="[Specifier]">
               <seg type="[Type]" ana="terennüm">[Written line of text]
               </seg>
            </stage>
         </l>
      </lg>
      <!-- Deletable. -->
      <note type="lyricist">
         <!-- Standard (otherwise deletable). -->
         <supplied reason="provided-by-editor" cert="[0-1]" resp="#[ID]">
            <anchor xml:id="w[ID]s"/>[Lyricist]<anchor xml:id="w[ID]e"/>
         </supplied>
      </note>
   </div>
</egXML>
```

Figure 29: Overview of the structure of block lyrics.

Individual Text Lines and Their Grouping

All text lines that contain lyrics (poetry or *terennüm*) and any kind of information regarding the lyrics themselves (such as the indication of the *miyanhâne*) or any performative information or instruction are included in one or more tei:lg elements, according to the internal structure of a written block text and the sung parts and instructions and information pertaining to it.

The text structure of a vocal piece can be quite complex, and considering performance instructions, the actual act of singing can become even more complex. For example, one poem of a certain *bahir* (plus any possible *terennüm* lines or performance instructions) may be nested into another poem, or distiches of two poems of a different *bahir* may alternate, which again may have their own *terennüm* and performance instructions. As this is a critical text edition, such dependencies for the act of vocal performance are not considered in the TEI structure but are reflected in MEI for the music edition.

Therefore, the following definition and implementation of a line group are used: A new tei:lg element begins with a new poem (if consecutive) or parts of a poem (in case of nested lyrics), whether the *bahir* is the same or not (Figure 30). Any other text, to be performed or to indicate any instruction or information that follows the preceding poetic lyrics (i.e. before another poem starts) belongs to the same tei:lg element. All @n values are incremented consecutively. In the TEI schema, a poem or poetic lyrics are those texts that follow a syntactic structure of the underlying language, whereas other sung lyrics *(terennüm)* consist of stand-alone lyrics with no syntactic structure. Poetic and other sung lyrics may mix in one line (especially along Persian pieces) but are usually distinct lines of text.

With the definition for tei:lg, two additional mandatory attributes are used (Figure 30). The value of @decls refers directly to the value of tei:metDecl[@xml:id="vezin"]/tei:metSym[@xml:id] in the TEI header and identifies the specific *bahir* subtype. With @rhyme, the four lines of a poem are analyzed by their rhyme scheme, with four hyphenated lowercase letters, e.g. @rhyme="a-a-b-a".

```
<egXML source="#NE204pc78">
   <lg n="1" decls="hezec4" rhyme="a-a-b-a">[Text lines]
   </lg>
   <lg n="2" decls="remel5" rhyme="a-a-b-a">[Text lines]
   </lg>
   <lg n="3" decls="hezec4" rhyme="a-a-b-a">[Text lines]
   </lg>
   <lg n="4" decls="remel5" rhyme="a-a-b-a">[Text lines]
   </lg>
   <lg n="5" decls="muzari2" rhyme="a-a-b-a">[Text lines]
   </lg>
</egXML>
```

Figure 30: Overview of the structure of different line groups with different *bahir* types.

In the example shown in Figure 30, we have hemistichs from three different poems among five individual line groups. The first two distiches with the *vezin* "Hezec 4" and "Remel 5" are intermittent (i.e. one hemistich of each follows the other). While the third distich is in the *vezin* "Muzâri 2" and followed by interspersed *terennüm*. The tei:lg element may also have a @xml:lang attribute with an ISO 639-3 value if the entire content of this line group is in a different language than the default Ottoman Turkish, e.g., Persian or Arabic. Consistently, all nested elements may carry this attribute if it is a single line or words within that are in a different language.

Independent of the count of the tei:lg element, each tei:l element therein for each text line in the original source has a mandatory @n with a consecutively incrementing value (Figure 31). While the prosodic structure of each tei:l that contains poetic lyrics is determined by tei:lg[@decls] in its standard pattern (compare to Figure 24), deviations from it can be directly indicated by an optional @real that "overwrites" the inherited pattern from the tei:lg.

```
<egXML source="#NE204pc78">
   <lg n="4" decls="remel5" rhyme="a-a-b-a">
      <l n="16" real="-uII|-u--|IZI-|Iu--|">
      [Instead of the standard Remel 5 "-u--|-u--|-u--|-u--|"]
      </l>
   </lg>
</egXML>
```

Figure 31: Example of a lyrics line with a different scansion than the default for the hemistiches.

The identification of the type of sung text itself takes place in the tei:l element by one or more tei:seg elements (Figure 32) which must begin directly following the parent tei:l element. If the text written in a line is of informative or instructive character, its tei:seg element is contained in tei:stage, which also may directly follow tei:l, but not necessarily (depending on the position of this type of text in a line). Detailed information on the text type and content is provided by @type and @ana, while the combination of the values of both attributes is constrained. For example, @type="instruction" can never be combined with @ana="mainPartLyrics".

```
<egXML source="#NE204pc50">
   <l n="1">
      <seg type="vocal" ana="mainPartLyrics">
      Şükūfezār-ı ʿiẕārıñ gülüñ naẓīresidir</seg>
   </l>
   <l n="2">
      <seg type="vocal" ana="mainPartLyrics">
      Bahāra ḳarşu hezārıñ o bir mesīresidir</seg>
   </l>
   <l n="3" real="u-u-|uu-I|u-u-|--|">
      <seg type="vocal" ana="mainPartLyrics">
      Şorulsa Vāṣıf-ı zāre lebān-ı bostānıñ</seg>
   </l>
   <l n="4" real="u-u-|uuI-|u-u-|uu-|">
      <seg type="vocal" ana="mainPartLyrics">
      Çilek şekerlemesi yāsemen ḫamīresidir</seg>
   </l>
   <l n="5">
      <seg type="vocal" ana="terennüm">
      ʿömrüm yālā yele lel lel le le lel lī mīrim yālā yele</seg>
   </l>
   <l n="6">
      <seg type="vocal" ana="terennüm">
      le le le le le le lī yār gülüñ naẓīresidir</seg>
   </l>
</egXML>
```

Figure 32: Examples of the markup for different types of text lines.

But especially in Persian pieces, poetic lyrics, and t*erennüm* may be intertwined (Figure 33).

```
<egXML source="#NE204pc78">
   <l n="1" real="u---|Z-I|ZI-I|Z--|">
      <seg type="vocal" ana="terennüm">āh</seg>
      <seg type="vocal" ana="mainPartLyrics">Güẕeşt ārzū ez-ḥad</seg>
      <seg type="vocal" ana="terennüm">āhā āhā</seg>
   </l>
</egXML>
```

Figure 33: Example of the markup of different types within a text line.

The tei:stage element must also directly be followed by tei:seg indicating that the text contain within is indicating a performance instruction (Figure 34). The type of performance instruction is marked up in the @type and @ana attributes of tei:stage, where again constraints of the combination of values come into effect. The combination of tei:stage and tei:seg covers two different layers in the text information and differentiates them in the TEI structure. While tei:stage indicates what and possibly how something in the sung poetry is performed, the content of tei:seg only identifies that the text written is for a performance instruction. The difference between the two becomes clear when looking at the following example. The instruction to terminate a vocal performance is often just written with the Arabic letter "م" and the abbreviation needs interpretation and is to be reconstructed by the editor to the word *[tem]me*, because of the implicit character of a performance instruction.

```
<egXML source="#NE204pc78">
   <l n="1" real="u---|Z-I|ZI-I|Z--|">
      <seg type="vocal" ana="terennüm">āh</seg>
      <seg type="vocal" ana="mainPartLyrics">Güẕeşt ārzū ez-ḥad</seg>
      <seg type="vocal" ana="terennüm">āhā āhā</seg>
   </l>
</egXML>
```

Figure 34: Example of the markup for a performance instruction.

References to the critical apparatus are indicated in the block text markup by two empty tei:anchor elements (Figure 35). Their @xml:id values consist of a prefix "w" (for "witness"), a unique and incrementing numerical value, and a closing "s" (for start) or "e" (for the end). These values are later referenced by tei:app in the apparatus.

```
<egXML source="#NE204pc104">
   <head n="1">
      <anchor xml:id="w4469s"/>Semāʿī İmām-ı Şehriyārī ʿAlī Efendi
      <anchor xml:id="w4469e"/>
   </head>
</egXML>
```

Figure 35: Example of the mark-up bracketing text to be referenced in the critical apparatus.

The tei:anchor in tei:head always refers to tei:div[@type="provenance"] in the apparatus, where other text witnesses containing this piece are listed. Within the sung lyrics, tei:anchor is set to bracket a specific text passage that is different from any other source or sources, and refers to tei:div[@type="readings"] in the apparatus.

To relate information on the lyricist (otherwise only mentioned in tei:titleStmt/tei:author in the header) to the critical apparatus and rectify the attribution and certainty, a tei:note element is provided following the lyrics (Figure 36). As the lyricist is not mentioned, the information on the authorship is provided with tei:supplied, stating the reconstruction by @reason="provided-by-editor", and replicating the values of @cert and @resp from tei:titleStmt/tei:author.

```
<egXML source="#NE204pc78">
   <note type="lyricist">
      <supplied reason="provided-by-editor" cert="1" resp="#ND">
         <anchor xml:id="w2239s"/>Lyricist: Emîr Hüsrev-i Dihlevî
         <anchor xml:id="w2239e"/>
      </supplied>
   </note>
</egXML>
```

Figure 36: Example of a lyricist linked to the critical apparatus.

Reference to the critical apparatus is again given by tei:anchor elements. They refer to tei:div[@type="annotations"] in the apparatus. In case the lyricist is unknown, the tei:note element with all child nodes can be deleted, unless there is additional information to be stated on an unknown lyricist in the apparatus.

The Critical Apparatuses

The structure of all apparatuses is shown in Figure 37.

```
<egXML>
   <back>
      <div type="provenance">[List of other witnesses containing the piece]
      </div>
      <div type="readings">[Text passages with other wording in a specific source]
      </div>
      <div type="annotations">[Information on the lyricist]
      </div>
   </back>
</egXML>
```

Figure 37: Overview of the structure of the critical apparatus.

The first apparatus tei:div[@type=”provenance”] enumerates all other sources with the same piece (Figure 38), as documented in tei:sourceDesc in the TEI header. The apparatus entry with tei:app refers back to the respective two tei:anchor elements noted in tei:head and picks up their @xml:id values as those for @from and @to. The use of these attributes is concordant with the use of the double-end point apparatus not embedded in-line in the text, as indicated by tei:variantEnconding in the TEI header. The necessary tei:lem element repeats the base text bracketed by tei:anchor, while tei:note encloses the text that refers to the different witnesses. This element is chosen instead of tei:rdg because this text originates from editorial research.

```
<egXML source="#NE204pc49">
   <app from="#w2s" to="#w2e">
      <lem>Beste çenber İsaḳ</lem>
      <note>The lyrics appear in
         <ref target="#cmo_source_00000091">NE3466</ref>, fol. 252v;
         <ref target="#cmo_source_00000075">HB1</ref>, page 406;
         <ref target="#cmo_source_00000023">HB2</ref>, page 408 and
         <ref target="#cmo_source_00000092">Ha</ref>, page 621.
      </note>
   </app>
</egXML>
```

Figure 38: Example of the critical apparatus listing other sources with the same piece.

Apparatus tei:div[@provenance=”readings”] lists all spelling variations of a specific text passage (including omission of words), therefore the proper tei:rdg element is used in this case (Figure 39). Its number and actual configuration depend on whether one or more (or all) different sources feature the same variation or any source a different one. The actual type of variation is given in @type, e.g., a misspelled word, an orthographic variation, synonymy, etc. The use of this attribute not only provides an additional asset for indicating the editorial decision but also e.g., facilitates statistical queries.

In the first case, the same variation in several different sources, the unique identifiers from the source catalog URLs (the same as in tei:witness[@xml:id]) are listed in @wit separated by a blank space. The references for the individual siglum are displayed as usual with separate tei:ref elements.

```
<egXML source="#NE204pc49">
   <app from="#w20s" to="#w20e">
      <lem>ceẕbe-i</lem>
      <rdg wit="#cmo_source_00000091 #cmo_source_00000075 #cmo_source_00000023"
      type="misspelled">cezbe-i
         <ref target="#cmo_source_00000091">NE3466</ref>,
         <ref target="#cmo_source_00000075">HB1</ref>,
         <ref target="#cmo_source_00000023">HB2</ref>
      </rdg>
   </app>
   <app from="#w25s" to="#w25e">
      <lem>revīş</lem>
      <rdg wit="#cmo_source_00000092" type="misspelled">reviş
         <ref target="#cmo_source_00000092">Ha</ref>
      </rdg>
      <rdg wit="#cmo_source_00000091" type="variant-reading">rīş
         <ref target="#cmo_source_00000091">NE3466</ref>
      </rdg>
   </app>
</egXML>
```

Figure 39: Examples of different spelling variations among various sources.

Likewise, all different spellings in other sources are listed individually, as the type of variation may also vary. The spelling variations given here only concern those in other musical sources. Spelling variations that appear in the divan of a poet are treated in the third and last apparatus.

The remarks given in tei:div[@type=”annotations”] (Figure 40) can be related to any tei:anchor elements in tei:body. It provides a variety of information on the actual piece, its critical edition, or the lyricist(s). Additional pointers in tei:head (with the piece title as a proxy for the entire piece) can be referenced here for additional information on the piece:

```
<egXML source="#NE204pc78">
   <app from="#w2032s" to="#w2032e">
      <lem>Kār devr-i Hindī ḫāce'niñ</lem>
      <note>TMKlii no. 105 has the text with vowel points. The editors followed
      this manuscript for vocalisation of terennüm in the transcription.
      </note>
   </app>
</egXML>
```

Figure 40: Example of a general note on a certain part of lyrics.

Textual variations appearing in a divan of a poet can be pointed out in this section (Figure 41). Therefore, the text editor makes a clear separation between two different types of textual variations: 1. The text variants that appear in a compilation of musical sources (lyrics or notation miscellanies), and 2. those that appear in a literary source (a divan of a poet or miscellanies of poetry).

```
<egXML source="#NE204pc78">
   <app from="#w2189s" to="#w2189e">
      <lem>medār-ı tū ey dil</lem>
      <note>medār ey dōst (Hâfız-ı Şîrâzî 1983)</note>
   </app>
</egXML>
```

Figure 41: Example of a textual variation appearing in a literary source, here in a divan.

This section can also detail any consideration of the lyricist(s) of a piece and provide a textual explanation about the degree of certainty given in @cert in different elements (Figure 42, compare to Figure 11).

```
<egXML source="#NE204pc49">
   <app from="#w47s" to="#w47e">
      <lem>Lyricist Hâmî</lem>
      <note>The lyrics are by a poet with the pen name (mahlas) Hâmî, indicated in
      the last line of the lyrics. It is possible that the poet is in fact Hâmî
      Ahmed Âmidî (d. 1747), though the editors could not locate the lyrics in his
      dîvân; see
         <ref target="https://www.zotero.org/neslihandemirkol/items/Q2HCUPQQ">
         Hâmî Ahmed Âmidî 1885</ref>
      and
         <ref target="https://www.zotero.org/neslihandemirkol/items/7UDKRYQU">
         Yılmaz 2017</ref>.
         <ref target="https://www.zotero.org/neslihandemirkol/items/XHEPKTYF">
         Öztuna (2006, vol. 1, 426)</ref>
      and
         <ref target="https://www.zotero.org/neslihandemirkol/items/F58H6YW9">
         Aksüt (1983, vol. 1, 148)</ref>
      attribute the lyrics to Mehmed Kâmî Efendi (d. 1724). However, the editors
      could not locate the poem in his dîvân either; see
         <ref target="https://www.zotero.org/neslihandemirkol/items/2LYLMGGG">
         Erişen Yazıcı 2017</ref>
      and
         <ref target="https://www.zotero.org/neslihandemirkol/items/IWPP8RKS">
         Özyılmaz 1994</ref>.
      </note>
   </app>
</egXML>
```

Figure 42: Notes on the lyricist with explanations why this individual has been reconstructed

With tei:ref, a link to a secondary source cited can be given to a persistent identifier of a bibliographic record stored in Zotero (n.d.). This solution was applied because there is already an existent CMO Zotero database for both musical and literary secondary literature. Thus, the mirroring of bibliographic data and their additional modeling in a TEI template with tei:bibl and tei:cit can also be avoided since e.g., the use of tei:quote and tei:q with indirect quotes is somewhat problematic. This method of external reference keeps the TEI slim and also contributes to linking open data.

The TEI Glossary Templates

The glossaries are intended to provide information on certain categories of terms and the respective definitions as used in the CMO project. Depending on the category being described, the glossaries have a slightly different format, but the structure follows the TEI dictionary module. As separate TEI files, they comprise of a header with metadata and a tei:text/tei:body containing the terms and definitions. A typical entry from the glossary on poetic forms and genres is shown in Figure 43.

```
<egXML>
   <text>
      <body>
         <div type="glossary">
            <entry xml:id="divan">
               <form>
                  <orth>Dîvân</orth>
               </form>
               <sense>
                  <sense n="1">
                     <def>It is the collected works of a poet. It is not an
                     anthology, it is composed of the poems of a single poet.
                     It is not compiled by someone else but by the poet
                     him/herself. As it has certain requirements in terms of
                     form and content, it takes a long time for a poet to compile a
                     dîvân. To have a dîvân is a symbol of prestige and honor among
                     poets.</def>
                  </sense>
               </sense>
            </entry>
         </div>
      </body>
   </text>
</egXML>
```

Figure 42: Example entry from the poetic genre glossary.

The tei:entry element covers a term in specific orthographic forms by tei:form/tei:orth, although CMO only uses one, standardized spelling. As a term may have different meanings, a parent tei:sense element has 1-n other tei:sense elements, identified by @n, to provide the definition in tei:def. Additional mark-up may appear within, e.g. when references are made to cited literature, in the mentioned glossary especially to Andrews (1976). The value of tei:entry[@xml:id] is referred to in any appropriate tei:ref[@target], where linkage to the glossary is mandatory (as e.g., in certain tei:note elements within tei:titleStmt) or desired (e.g., in the critical apparatus).

The TEI dictionary module allows tailormade modeling for a large variety of content and levels of information. For example, the *usûl* rhythmic patterns (see Plaksin & Olley, 2019, p. 121) can be determined by their time units (*darb* or beats) or their timbre (structure of low- and high-pitched sounds, *düm-tek*), and of course, descriptive text. As the *usûl* is relative rather than an absolute measure-based time structure (Haug, 2019, p. 273; Plaksin & Olley, 2019, p. 126), there may be alternative definitions, also taking into consideration a diachronic perspective, changes of beat patterns over time. In such cases, the glossaries, therefore also need to reflect a certain vagueness in the definitions, which could be realized by the use of different tei:sense[@ana], such as “broad” and “narrow” descriptions.

Summary and Outlook

The set of TEI templates that are presented here (plus the schema not dealt with in detail) is the first attempt to establish a framework for a digital scholarly edition of the lyrics used in the repertoire of Ottoman vocal art music being the focus of the CMO project. It can also serve as a role model for other materials from intercommunal musical interaction in the Ottoman Empire and beyond (e.g., Greek, Armenian, Jewish), and related musical and literary traditions of influence (e.g., Persian, Arabian); see Olley (2017, pp. 171-183) for a concise overview.

Although the digital text edition is mostly a critical text edition, it demonstrates the potential for interaction with a critical music edition that focuses more on the performative aspects of the sung lyrics. The metrical structures as defined by tei:metDecl and embedded in tei:lg and

tei:l elements may, in fact, demonstrate a close relationship with the *usûl* rhythmic cycle (Neslihan Demirkol and C. Ersin Mıçı, personal communication, July 2022). The whole score encoded in MEI could easily be integrated via a tei:ptr element.

Scholarly editing in TEI is scalable. Other or new research questions not (yet) in the scope of the CMO project or beyond its deliverables and (currently) not reflected in the template can be added in subsequent editorial processes. For example, the metadata could be enhanced by the identification of individual hands in the sources, ideally related to personal names. Additional mark-up in the lyrics with the tei:term element could, for example, specify toponyms or anthroponyms, names of animals, flowers, types of artefacts, or cultural practices – often used as metaphors or concepts[9] – for statistical analyses, or, more specifically, stylometric applications.

All materials created by the CMO project will all be available under culturally free licenses, i.e., at least CC BY-SA (n.d.). On the project website, the digital editions will be presented in a multi-modal format and a collated view. The philosophy of open access aims not only at a scholarly audience but also lyricists, musicians, and, possibly, citizen science.

For musicology, historical phenomena and processes in musical cultures can be opened up through digitally marked-up editions, just as the sources are of first-rate importance for Oriental studies. They offer the possibility of uncovering forgotten repertoire, shedding light on Ottoman poetry sung in a historical context, and contributing to a broad, multidisciplinary study of the history of the urban culture of the region, which combines influences from the Near East, Southeast Europe, the Caucasus, and Northeast Africa.

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9 One well-known example is *gül ü bülbül*, "rose and nightingale", as "beloved and lover" (Schimmel, 1958; Sinan Nizam, 2010), for a compendium see (Onay, 2009).

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