ἔκδοσις

Typesetting TEI xml Compliant Critical Editions

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Abstract

ekdosis is a LuaLaTeX package designed for multilingual critical editions. It can be used to typeset texts and different layers of critical notes in any direction accepted by LuaTeX. Texts can be arranged in running paragraphs or on facing pages, in any number of columns which in turn can be synchronized or not. In addition to printed texts, ekdosis can convert `.tex` source files so as to produce `TEI xml` compliant critical editions. Database-driven encoding under LaTeX then allows extraction of texts entered segment by segment according to various criteria: main edited text, variant readings, translations or annotated borrowings between texts. It is published under the terms of the GNU General Public License (GPL) version 3.

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This release of ekdosis consists of the following source files:

- `ekdosis.ins`
- `ekdosis.dtx`
- `ekdosis.el`
- `Makefile`

1 Introduction

The reader will find here, by way of introduction, a summarized version of the first part of an article that the author submitted some weeks ago to the *Journal of Data Mining and Digital Humanities* as a contribution to a Digital Humanities workshop held at Stanford University (April 15, 2019).[1]

The name of this package, ekdosis, derives from a Greek action noun—ἔκδοσις—the meaning of which is: "publishing a book", and also in concrete sense: "a publication, treatise". For us moderns, this term refers to a long tradition of scholarly work consisting in establishing from manuscript evidence the texts of Greek and Latin classics that were handled down through the Middle Ages to the time of the first printed editions. Of course, this definition is extendible to other languages as well. The basic premise is that critical editions exhibit reconstructed texts from manuscript evidence either under the title of the edited text (direct tradition) or from explicit citations or parallel passages or translations in other languages (indirect tradition).

Whether in print or digital, critical editions come with an apparatus criticus in which is mentioned all the evidence that was used to build the edited text. Arguably, it is precisely on this common point that the two kind of editions part ways for reading a traditional, well written apparatus criticus is only meant for experienced readers. Getting oneself familiarized with its many conventional rules is not unrelated to learning a language, equipped with technical terms, grammar rules and style embellishments, which came into existence out of over three centuries of scholarly attainments. Nevertheless, whereas this language is immediately accessible to human mind's ability to use language and interpret conventional symbols, it is quite inaccessible to a computer unless every item of information has been encoded in the rather dumb format that is suited to machines.

On the other hand, editions in print have their own limitations. For example, every detail that editors of classical texts decide to discard to save space, regardless to its relevance to the purpose of the edition, is lost permanently as in the case of dialectal coloring of ancient books. Furthermore, passages collected as indirect tradition are only available as references in the *apparatus testium* and cannot be referred to the original text. As a result, the reader is refrained from bestowing attention upon major parallel passages to understand better difficult passages.

To conclude on these issues, print publications and digital editions are often contrasted as they belonged to two different worlds.[2] It is commonly said that the content of editions

[1] Robert Alessi, "ekdosis: Using LuaLaTeX for Producing `TEI xml` Compliant Critical Editions and Highlighting Parallel Writings," *Journal of Data Mining and Digital Humanities: Collecting, Preserving, and Disseminating Endangered Cultural Heritage for New Understandings through Multilingual Approaches* (2020), hal: hal-02779803 (submitted).

[2] For a good illustration of this point, see Digital Latin Library, "Textual Criticism," https://digitallatin.org/library-digital-latin-texts/textual-criticism, accessed May 24, 2020, "Content, not Display."

in print is the result of the binding of the book itself as an object, whereas digital editions, in which format and presentation are by definition separated from content, are free from limitations coming from such bindings. To sum up from the foregoing considerations, this statement is likely to be qualified: as already seen above, the apparatus criticus must be looked at as a brilliant production of mind refined by centuries of scholarly tradition—and surely tradition must go on—arguably not as compact paragraphs that require special and painful training to be 'decoded'. On the other hand, what editions in print do not provide are what Donald J. Mastronarde and Richard J. Tarrant have called "actionable texts for use in digital research",[3] namely database-driven texts allowing the reader to select annotations and display or arrange translations, parallel passages or borrowings in a variety of ways.

ekdosis can be seen as an attempt at combining the two approaches.

1.1 Requirements

Please refer to sect. 16 on page 64.

1.2 Features

A list of the main features of ekdosis follows:—

(a) *Multilingual critical editions*: ekdosis can be used to typeset any number of texts in any direction accepted by LuaTEX. Running paragraphs of text can be arranged in any number of columns, either on single or facing pages, which in turn can be synchronized or not. ekdosis is also suitable for complex layouts as in the case of Arabic poetry or images where three-way alignment is required, or diagrams, *&c*.

(b) *Apparatus criticus*: Edited texts can receive multiple layers of apparatus, e.g. apparatus criticus (to record variant readings), apparatus fontium (to collect references to texts quoted or cited in the edited text), apparatus testium (to collect testimonia or parallel passages), or any kind of short notes to be printed on the same page as the edited text, *&c*.

(c) `TEI xml` output: ekdosis can be instructed to output both PDF and `TEI xml` files at the same time.

(d) *Database-driven encoding* under LaTeX of texts entered segment by segment allows for alignment of parallel texts from multilingual corpora.

Before going into detail, the following simple example will give the reader a general idea of the method of encoding with ekdosis authoritative texts composed of lemmata, in a way that is very close to `TEI xml` encoding:—

Listing 1: The "Peter/John" basic example

```
\begin{ekdosis}
  I
  \app{
    \lem{saw}
    \rdg{met}
  }
  my friend \app{\lem{Peter}\rdg{John}} at the station yesterday.
\end{ekdosis}
```

[3] Donald J. Mastronarde and Richard J. Tarrant, "Review: Guidelines for Encoding Critical Editions for the Library of Digital Latin Texts," Society for Classical Studies (Dec. 4, 2017), https://classicalstudies.org/scs-blog/donald-j-mastronarde/review-guidelines-encoding-critical-editions-library-digital-latin.

PDF output:—

1 I saw my friend Peter at the station yesterday.

---

1 saw] met Peter] John.

`TEI xml` output:—

```
<p>I
<app>
  <lem>saw</lem>
  <rdg>met</rdg>
</app>my friend
<app>
  <lem>Peter</lem>
  <rdg>John</rdg>
</app>at the station yesterday.</p>
```

As can be seen from listing 1 on the preceding page, the edition text is inserted in the `ekdosis` environment (l. 1 to 8). Then two `\app{`⟨*apparatus entry*⟩`}` commands (ll. 3 and 7) contain the lemma (`\lem{`⟨*lemma*⟩`}`), namely the reading that is accepted by the editor, and at least one variant reading (`\rdg{`⟨*reading*⟩`}`, ll. 5 and 7). As the listing shows, the editor is free to lay out the code in a legible manner to the eye: the first lemma above spans several lines whereas the second one is written in sequence without spaces.

In the PDF ouput, the edition text is printed in the upper part of the page, above the line, and naturally shows the accepted readings. The margins are used for numeration. In the apparatus criticus, below the line, reference to the text is made by specifying the number of the line and if several entries refer to the same line, numbers are not repeated. Instead, entries are separated from one another by a broad horizontal space. Finally, a square bracket is used inside entries to distinguish the lemma from the variant readings.

Furthermore, as said above, if a `TEI xml` output be required, ekdosis compiles an additional `.xml` file an excerpt of which is provided above.

2 The Basics of ekdosis

2.1 Loading the Package—General Options

ekdosis is loaded in the preamble like so:—

```
\usepackage{ekdosis}
```

ekdosis may be loaded with four optional 'named arguments' either of which is set using the syntax ⟨*key*⟩=⟨*value*⟩. The description of the optional arguments follows.

The reader is invited to refer to the relevant sections of this documentation for more information on how to use them.

layout `layout=float|footins` `Default: float`

By default, layers of critical notes are inserted as a floating environment to be printed at the bottom of pages. `layout=footins` can be set to insert critical notes in the default footnote block which can be considered to be a special kind of float that is printed at the bottom of pages. In this case, the apparatus criticus will be inserted between regular numbered footnotes, but will carry no footnote mark of its own.

divs `divs=ekdosis|latex` Default: `ekdosis`

In many occasions, LaTeX standard textual divisions do not meet the specific requirements of classical and literary texts, the divisions of which may depend on many different received traditions. ekdosis provides a flexible mechanism in which format and presentation have been carefully separated from content. It is designed to build un-numbered TEI divisions allowed to nest recursively.[4] However, if `divs` be set to `latex`, LaTeX standard textual divisions can be used and will be translated into TEI numbered `<div>` elements.

It must be noted that the two styles are mutually exclusive.

parnotes `parnotes=true|false|roman` Default: not set

This named argument does not need a value as it defaults to `true` if it is used. Apparatus criticus typeset by ekdosis may contain notes and footnotes. The latter can be laid out as paragraphed notes below the block of critical notes by means of the parnotes package. Additionally, `parnotes=roman` prints these footnotes numbered with Roman numerals.

teiexport `teiexport=true|false|tidy` Default: not set

This named argument does not need a value as it defaults to `true` if it is used. If `teiexport` be set to `true`, ekdosis is instructed to output both PDF and TEI `xml` files at the same time. By default, the TEI file will receive the same basename as the `.tex` source file, suffixed with `-tei.xml`. The raw `.xml` file that is produced by ekdosis can be further processed by the tidy console application.[5] To make this happen, tidy must be installed and the `.tex` source file must be compiled with the `--shell-escape` facility so that spawning programs from LaTeX can be allowed.[6]

As an example, the following line loads ekdosis and instructs it to output a TEI `xml` file (in addition to the PDF one) and to use parnotes to format with Roman numerals the footnotes that are inserted in the apparatus criticus:—

```
\usepackage[teiexport, parnotes=roman]{ekdosis}
```

2.2 Witnesses, Hands, Shorthands & Scholars

Any reference that is to be used in the apparatus criticus must be "declared" in the preamble beforehand, namely: manuscript sigla (either for single manuscripts or manuscript families, primary or later hands, *&c.*) or abbreviated last names of scholars. To that effect, ekdosis provides the following preamble-only commands:—

\DeclareWitness **Witnesses** `\DeclareWitness{`⟨*unique id*⟩`}{`⟨*rendition*⟩`}{`⟨*description*⟩`}[`⟨*options*⟩`]`

This command requires three mandatory arguments enclosed between curly braces used to specify consecutively:

(a) The unique identifier of the witness to be used both in the `.tex` source file and as an `xml:id` in the TEI `xml` output if any.

(b) The rendition to be used in the printed apparatus criticus, which also will be found within the `<sourceDesc>` element of the TEI header where the description of the witness occurs, within a `<abbr type="siglum">` element.

(c) A basic description of the manuscript to be found in a typical printed Conspectus Siglorum, namely: the name of the manuscript followed by its call number.

[4] See below, sect. 8 on page 31.

[5] See http://www.html-tidy.org.

[6] See https://texfaq.org/FAQ-spawnprog for more information on how to do this.

Finally, the optional argument of `\DeclareWitness` accepts a comma-separated list of the following "name=value" arguments that are used to collect items of information to be found within the `<msIdentifer>` element in the `TEI` header:—[7]

settlement `settlement`=⟨*name*⟩: The name of a city or administrative unit.

institution `institution`=⟨*name*⟩: The name of an institution such as a university or library.

repository `repository`=⟨*name*⟩: The name of the repository within which the witness is stored.

collection `collection`=⟨*name*⟩: The name of a collection of manuscripts.

idno `idno`=⟨*call #*⟩: Any form of call number.

msName `msName`=⟨*name*⟩: The name commonly used for the witness.

origDate `origDate`=⟨*date*⟩: Any form of date used to identify the date of origin for the witness.

To take here one example, a witness such as the *Marcianus Graecus* 269, referred to as manuscript 'M' in the editions, which contains sixty treatises from Hippocrates, could be declared as follows:—

```
\DeclareWitness{M}{M}{\emph{Marcianus Gr.} 269}[
        settlement=Venice,
        institution=Marciana Library,
        msName=Marcianus Gr.,
        idno=269,
        origDate=s. X]
```

\DeclareHand **Hands** `\DeclareHand{`⟨*unique id*⟩`}{`⟨*base ms.*⟩`}{`⟨*rendition*⟩`}[`⟨*note*⟩`]`

This command requires three mandatory arguments enclosed between curly braces and one optional argument between square brackets used to specify consecutively:—

(a) The unique identifier of the hand to be used both in the `.tex` source file and as an `xml:id` in the `TEI xml` output if any.

(b) The unique idendifier of the witness the hand is related to. Of course, this witness must have been declared beforehand.

(c) The rendition to be used in the printed apparatus criticus, which also will be found within the `<handNote>` element of the `TEI` header where the description of the hand occurs, within a `<abbr type="siglum">` element.

(d) Some further information about the hand.

To continue the preceding example, here is how additions and corrections found in the *Marcianus Gr.* 269 could be declared after this witness has been declared itself:—

```
\DeclareHand{M1}{M}{M\textsuperscript{1}}[Emendatio scribae ipsius]
\DeclareHand{M2}{M}{M\textsuperscript{2}}[Manus posterior]
```

As can be seen, values such as `M`, `M1` and `M2` in the `.tex` source file will be printed as M, M^1 and M^2 respectively. Not only the code gains legibility, but also flexibility for simply changing any declared rendition will update corresponding sigla thoughout the entire edition.

As a final example, here is how ekdosis would encode information as declared above for the *Marcianus Gr.* 269 should a `TEI` output be required:—

```
<sourceDesc>
  <listWit>
    <witness xml:id="M">
    <abbr type="siglum">M</abbr>
```

[7] See https://tei-c.org/release/doc/tei-p5-doc/en/html/MS.html#msid for detailed information on these elements.

```
    <emph>Marcianus Gr.</emph>269
    <msDesc>
      <msIdentifier>
        <settlement>Venice</settlement>
        <institution>Marciana Library</institution>
        <idno>269</idno>
        <msName>
          <emph>Marcianus Gr.</emph>
        </msName>
      </msIdentifier>
      <physDesc>
        <handDesc hands="2">
          <handNote xml:id="M1">
            <abbr type="siglum">M
            <hi rend="sup">1</hi></abbr>
            <p>Emendatio scribae ipius</p>
          </handNote>
          <handNote xml:id="M2">
            <abbr type="siglum">M
            <hi rend="sup">2</hi></abbr>
            <p>Manus posterior</p>
          </handNote>
        </handDesc>
      </physDesc>
      <history>
        <origin>
          <origDate>s. X</origDate>
        </origin>
      </history>
    </msDesc></witness>
  </listWit>
</sourceDesc>
```

\DeclareShorthand **Shorthands** `\DeclareShorthand{`⟨*unique id*⟩`}{`⟨*rendition*⟩`}{`⟨*csv list of witnesses*⟩`}`
This command provides a convenient way to declare *families* of witnesses. It takes three mandatory arguments used to specify consecutively:—

(a) The unique identifier of the family to be used in the `.tex` source file.
(b) The rendition to be used in the printed apparatus criticus.
(c) A comma-separated list of previously declared witnesses.

As an example, the manuscripts of Caesar's *Gallic War* are divided into two families: α, which includes mss. A, M, B, R, S, L and N, and β, which includes mss. T, f, U and l. Therefore, provided that all these witnesses have been already declared, here is how the two families α and β could be declared:—[8]

```
\DeclareShorthand{a}{α}{A,M,B,R,S,L,N}
\DeclareShorthand{b}{β}{T,f,U,l}
```

Then, symbols `a` and `b` can be used in the `.tex` source file in place of manuscripts that belong to either family.

\DeclareScholar **Scholars** `\DeclareScholar{`⟨*unique label*⟩`}{`⟨*rendition*⟩`}`

[8] These witnesses are used in the example provided below in listing 5 on page 15.

The *Conspectus Siglorum* that is placed ahead of the edition text is traditionally divided into two parts: a) *Codices*, which provides the list of sigla used in the apparatus, b) *Editiones uel Studia*, which provides references to scholars whose published or unpublished works contain conjectures used in the apparatus criticus. `\DeclareScholar` takes two mandatory arguments used to specify consecutively:—

(a) A unique label used in the `.tex` source file to refer to the work where the conjecture is found.
(b) The rendition to be used in the printed apparatus criticus.

As ekdosis can include and use `TEI xml` compliant lists of references,[9] it is avisable to use Bib(LA)TEX labels in the first argument of `\DeclareScholar`. Likewise, shorthands fields from the bibliographical database can be recalled from within the second argument of `\DeclareScholar`:—

```
\DeclareScholar{Wil}{Wilamowitz}
% or for example:
\DeclareScholar{Wil}{\citename{Wil}{shorteditor}}
```

2.2.1 Printing Formatted Witnesses — Conspectus Siglorum

Once witnesses, hands and scholars have been declared, ekdosis provides two commands to have them printed as declared from their indentifiers.

`\getsiglum` `\getsiglum{`⟨*csv list of witnesses or single witness*⟩`}` behaves exactly as the `wit` optional argument of `\lem` and `\rdg` described below on pages 11 and 12. From a single identifier or from a comma-separated list of identifiers, it returns their formatted counterparts. To return to the example provided on pages 7–8, `\getsiglum{M}` would return M, while `\getsiglum{M1}` would return M^1.

`\SigLine` `\SigLine{`⟨*unique id*⟩`}` returns from ⟨*unique id*⟩ used in the first argument of `\DeclareWitness`[10] a line ready to be inserted in a table set to print a Conspectus Siglorum with the following items of information separated by the symbol `&`: the siglum referring to the witness, the contents of the `description` field and the contents of the `origDate` field. An example of how one could print the Conspectus Siglorum of the manuscripts of Caesar's *Gallic War* from the list provided on the previous page follows:—

Listing 2: Conspectus Siglorum of Caesar's *Gallic War*

```
\begin{xltabular}[c]{0.75\linewidth}{lXl}
  \caption*{\textbf{Conspectus siglorum}}\\
  \multicolumn{3}{c}{\emph{Familia} \getsiglum{a}}\\
  \SigLine{A}\\
  & \getsiglum{A1} \emph{Emendationes scribae ipsius} & \\
  \SigLine{M}\\
  [...]
  \SigLine{N}\\
  \multicolumn{3}{c}{\emph{Familia} \getsiglum{b}}\\
  \SigLine{T}\\
  [...]
  \SigLine{l}\\
\end{xltabular}
```

[9] See below sect. 10.6 on page 43.
[10] See above on page 6.

Conspectus siglorum

	Familia α	
A	*Bongarsianus* 81	s. IX–X
	A^1 *Emendationes scribae ipsius*	
M	*Parisinus Lat.* 5056	s. XII
B	*Parisinus Lat.* 5763	s. IX–X
R	*Vaticanus Lat.* 3864	s. X
S	*Laurentianus* R 33	s. X
L	*Londinensis* Br. Mus. 10084	s. XI
N	*Neapolitanus* IV, c. 11	s. XII
	Familia β	
T	*Parisinus Lat.* 5764	s. XI
f	*Vindobonensis* 95	s. XII
U	*Vaticanus Lat.* 3324	s. XI
l	*Laurentianus* Riccard. 541	s. XI–XII

2.3 Editing a Single Text With No Translation

`ekdosis` Running paragraphs of one single text to be edited should be inserted in the `ekdosis` environment, like so:—[11]

```
\begin{ekdosis}
  Edition text goes here.
\end{ekdosis}
```

`\app` **Apparatus Entries** `\app[type=`⟨*type*⟩`]{`⟨*apparatus entries*⟩`}`
This command takes one mandatory argument and accepts one optional argument. Once references to be used as witnesses in the apparatus criticus have been declared in the preamble as described in sect. 2.2 on pages 6–9, the `\app` command is used for inserting entries in the apparatus criticus, either lemmata, readings or notes, like so:—

```
I saw my friend \app{\lem{Peter}\rdg{John}} yesterday.
or:
I saw my friend
  \app{
    \lem{Peter}
    \rdg{John}
  }
yesterday.
```

`\app` accepts one further optional argument:—

`type` `type=`⟨*type*⟩ `Default: default`
As will be described below in sect. 4.3 on page 21, ekdosis initially sets one layer of notes—the `default` layer—in the apparatus criticus. This layer is fit to receive notes related to variant readings from witnesses and sources used by the editor to establish the edition text. Additional layers can be defined to receive other kinds of notes, such as references to texts quoted or cited in the text of the edition (*apparatus fontium*), references to testimonia, or quotations of the edited text by other authors (*apparatus testium*), explanatory notes,

[11] See above listing 1 on page 4.

and so forth.[12] Once additional layers have been defined and assigned to new 'types', such as 'testium' and the like, these types can be used as values appended to the `type` 'named option'. For more information about inserting notes in multiple-layer apparatus, see sect. 5 on page 22.

Base text and variants As can be seen in the example above, there are two kinds of individual readings: the *lemma*, which contains the base text accepted by the editor, and the *reading*, which contains deviant readings rejected by the editor.

`\lem` **Lemmata** `\lem[`⟨*options*⟩`]{`⟨*lemma text*⟩`}`

As ⟨*lemma text*⟩ is a word or a phrase judged by the editor to be authentic or authoritative, `\lem` prints it by default both in the edition text and as the first part of a new entry in the apparatus criticus, preceded by the line number where it occurs or a broad space if the entry refers to the same line as the preceding entry. The optional argument of `\lem` accepts the following comma-separated list of "name=value" arguments:—

`wit` `wit=`⟨*csv list of witnesses*⟩

While a single witness may be recorded as in `wit=A`, comma-separated lists of multiple witnesses must obviously be enclosed in curly braces, like so: `wit={A,B,C}`. It must be noted that witnesses can be grouped by using spaces as separators, like so: `wit={A,B,C,␣D,E,F}`.

`alt` `alt=`⟨*alternate lemma*⟩

While the mandatory argument of `\lem`, ⟨*lemma text*⟩, is always used to print the edition text in the upper part of the page, ⟨*alternate lemma*⟩, if specified, supersedes what is printed in the related entry of the apparatus criticus. This mechanism is useful in more than one respect. For instance, it can be used to insert abbreviated lemmata in the apparatus criticus, or to introduce an alternate way of writing entries with Latin technical terms in the apparatus criticus as will be demonstrated below in the example provided by listing 3 on page 13.

`sep` `sep=`⟨*separator*⟩

`sep` allows to change the symbol used to separate the lemma text from deviant readings, which is by default the closing square bracket (`]`)

`nosep` `nosep=true|false`

This named argument does not need a value as it defaults to `true` if it is used. Obviously, `nosep` removes the separator mentioned above.

`nolem` `nolem=true|false`

This named argument does not need a value as it defaults to `true` if it is used. `nolem` completely removes the lemma text from the related entry in the apparatus criticus.

`type` `type=`⟨*value*⟩

This named argument has no effect on the apparatus criticus of the edition in print, but it is used in the `TEI xml` ouput to classify the variation recorded in the entry according to some convenient typology. Categories such as lexical, morphological, orthographical and the like may apply.

[12] See below, sect. 5.2 on page 23.

Finally, four named arguments can be used to insert words at the following specific places in the lemma text:

pre `pre=`⟨*words*⟩
`pre` inserts ⟨*words*⟩ *before* the lemma text.

post `post=`⟨*words*⟩
`post` inserts ⟨*words*⟩ *after* the lemma text.

prewit `prewit=`⟨*words*⟩
`prewit` inserts ⟨*words*⟩ *before* the list of witnesses.

postwit `postwit=`⟨*words*⟩
`postwit` inserts ⟨*words*⟩ *after* the list of witnesses.

\rdg **Readings** `\rdg[`⟨*options*⟩`]{`⟨*variant reading*⟩`}`
As ⟨*reading*⟩ is a word or a phrase judged by the editor to be unsatisfactory or corrupted, `\rdg` prints it by default in the last part of the corresponding entry in the apparatus criticus, after the symbol that is used to separate words of the base text (the lemma text) from words rejected by the editor. The optional argument of `\rdg` accepts a comma-separated list of "name=value" arguments that is almost identical to `\app`. Therefore, emphasis will be placed here only on the differences. The reader is invited to refer to the description provided above on pages 11–12 for more detailed information:—

wit `wit=`⟨*csv list of witnesses*⟩

alt `alt=`⟨*alternate reading*⟩

nordg `nordg=true|false`
This named argument does not need a value as it defaults to `true` if it is used. `nordg` completely removes the variant reading from the related entry in the apparatus criticus.

type `type=`⟨*value*⟩

pre `pre=`⟨*words*⟩

post `post=`⟨*words*⟩

prewit `prewit=`⟨*words*⟩

postwit `postwit=`⟨*words*⟩

\note **Notes** `\note[`⟨*options*⟩`]{`⟨*text*⟩`}` or `\note*[`⟨*options*⟩`]{`⟨*text*⟩`}`
\note* It may happen that editorial notes be needed to record short comments of general nature *between* lemmata and readings. `\note` inserts inline comments while `\note*` places comments below the entire apparatus block. Furthermore, if ekdosis has been loaded with the `parnotes` option as described above on page 6, `\note*` will use the parnotes package to lay out the notes as an additional paragraph below the apparatus criticus. The optional argument of `\note`/`\note*` accepts the following comma-separated list of "name=value" arguments:—

pre `pre=`⟨*words*⟩
`pre` inserts ⟨*words*⟩ immediately before the note.

post `post=`⟨*words*⟩
`post` inserts ⟨*words*⟩ immediately after the note.


Under no circumstances is it permitted to insert this command `\note` or `\note*` inside the argument of `\lem` or `\rdg`. `\note`/`\note*` must go *between* these commands. As a general rule, within `\app{}` elements, notes are inserted immediately *after* the lemma or the variant reading they are related to. However, as will be described below in sect. 5.2 on page 23, the command `\note`—with no star appended—that is used to insert explanatory

notes or references to sources or testimonia is permitted within the mandatory argument of `\lem{}`, although it is subject to a very strict syntax.

Listing 3 provides an illustration of some of the possibilities afforded by the commands just described:—

Listing 3: The "Peter/John" full example

```
\begin{ekdosis}
  I
  \app{
    \lem[wit=A]{saw}
    \rdg[wit=B]{met}}
  my friend
  \app{
    \lem{Peter}
    \rdg{John}
  }
  at the station yesterday. We were both in a
  \app{
    \lem[wit=A]{great}
    \rdg[wit=B]{good}}
  mood.
  \app{
    \lem[wit=A, alt={How nice... said}]{\enquote{How nice to find
        you here!} he said.}
    \note*{There are no quotation marks in the mss.}
    \rdg[wit=B, alt=\emph{om.}]{}}
  I chuckled to myself, recalling the last time we
  \app{
    \lem[wit=A,nolem]{met}
    \rdg[wit=B, alt={\emph{post} met \emph{add.} there}]{met
      there}
    \note*{Ms. \getsiglum{B} provides other additions of this kind.}}.
\end{ekdosis}
```

```
I saw my friend Peter at the station yesterday. We were both in a great mood. "How
nice to find you here!" he said. I chuckled to myself, recalling the last time we met.

1 saw A] met B  Peter] John  great A] good B  1–2 "How nice... said A][i] om. B  2 post met add. there B[ii].

[i] There are no quotation marks in the mss.  [ii] Ms. B provides other additions of this kind.
```

Rem. 1 Close examination of lines 17–8 from listing 3 shows how `alt` has been used to insert an abridged lemma text in the apparatus criticus in print while keeping safe what is to be found in the `TEI xml` output.

Rem. 2 The same technique has been used at line 24 to insert alternate words, including Latin technical terms, in place of the variant reading. Hence the use of `nolem` at line 23 to remove the lemma text from the apparatus criticus in print.

Rem. 3 `\note*` has been used to insert short annotations in two places (ll. 19 and 26).

Rem. 4 For an example of the use of `nordg`, see below listing 5 on page 15, l. 11.

The corresponding `TEI xml` output produced by ekdosis from the LaTeX source file follows:—

Listing 4: The “Peter/John” full example: `TEI xml` output

```
<p>I
<app>
  <lem wit="#A">saw</lem>
  <rdg wit="#B">met</rdg>
</app>my friend
<app>
  <lem>Peter</lem>
  <rdg>John</rdg>
</app>at the station yesterday. We were both in a
<app>
  <lem wit="#A">great</lem>
  <rdg wit="#B">good</rdg>
</app>mood.
<app>
  <lem wit="#A">
  <quote>How nice to find you here!</quote> he said.</lem>
  <note>There are no quotation marks in the mss.</note>
  <rdg wit="#B" />
</app>I chuckled to myself, recalling the last time we
<app>
  <lem wit="#A">met</lem>
  <rdg wit="#B">met there</rdg>
  <note>Ms.
  <ref target="#B">B</ref>provides other additions of
  this kind.</note>
</app>.</p>
```

3 Alignment of Parallel Texts

As already said above,[13] ekdosis can arrange sundry texts in parallel columns—synchronized or not—either on the same page or on facing pages. Depending on what is needed, any text can be equipped with an apparatus criticus. The most common example is that of an edition of a classical text with an apparatus criticus accompanied by a translation into a modern language on the facing page. One can also imagine an edition of two classical texts or two different recensions of the same text, each of which provides variants recorded in separate apparatus crititus, laid out on the left-hand pages, with one or more translations on the corresponding right-hand pages, and so forth.

alignment

The `alignment` Environment `\begin{alignment}[`⟨*options*⟩`]`...`\end{alignment}`
This environment can be used as it is provided to typeset a standard critical edition, namely an edition text, equipped with an apparatus criticus and laid out on the left-hand pages, accompanied by a translation into a modern language on the facing pages.

edition
translation

Within `alignment`, two environments are available by default: `\begin{edition}` ...`\end{edition}` and `\begin{translation}`...`\end{translation}`. Obviously, the former is used to typeset the edition text with an apparatus criticus on the left, while the latter is used to typeset the translation on the right, like so:—

[13] See point (a) on page 4.

```
\begin{alignment}
  \begin{edition}
    First § of the edition text.
  \end{edition}
  \begin{translation}
    First § of the translation.
  \end{translation}
  \begin{edition}
    Second § of the edition text.
  \end{edition}
  \begin{translation}
    Second § of the translation.
  \end{translation}
\end{alignment}
```

edition*
translation*

Furthermore, so-called "starred" versions of these environments can be used at any point to synchronize texts, that is to print them in such a way that the tops of all paragraphs are vertically aligned. To that effect, it must be noted that merely applying this command on a single environment—for instance the leftmost one—will have all other associated paragraphs printed aligned.

While the whole edition text and the whole translation can be inserted in a single `edition`/`translation` environment respectively, it is recommended to enter both texts paragraph by paragraph as shown in the example above. Not only this method of encoding allows not to lose sight of paragraphs that are meant to be read together, but it is also the only way to align paragraphs in print, and it is much more suitable to mark up correspondence between spans of texts as will be demonstrated below in sect. 11 on page 48.

As an illustration, a short extract of Caesar's *Gallic War*, VI, XIII.1 follows.[14] See the list of sigla for manuscripts and manuscript families above on page 8. As this document is not set for duplex printing, both texts have been put together on the same page. However, the reader will find the full `.tex` source file in sect. 14.1 on page 56 and `TEI xml` output in sect. 14.2 on page 58. The corresponding PDF output is available in a separate file:—

Listing 5: Caesar's *Gallic War*, VI, 13.1

```
\begin{alignment}
  \begin{edition}
    \ekddiv{head=XIII, depth=2, n=6.13, type=section}
    In omni Gallia eorum hominum qui \app{
      \lem[wit=a]{aliquo}
      \rdg[wit=b, alt=in al-]{in aliquo}}
    sunt numero atque honore genera sunt duo. Nam plebes paene
    seruorum habetur loco, quae \app{
      \lem[wit={A,M}, alt={nihil audet (aut et \getsiglum{A1})
        per se}]{nihil audet per se}
      \rdg[wit=A1,nordg]{nihil aut et per se}
      \rdg[wit={R,S,L,N}]{nihil habet per se}
      \rdg[wit=b]{per se nihil audet}}, \app{
      \lem[wit=a]{nullo}
      \rdg[wit=b]{nulli}} adhibetur \app{
```

[14] Latin text: Caesar, *Gallic War* (*Guerre des Gaules*), ed. L.-A. Constans (Collection des Universités de France; Paris: Les Belles Lettres, 1987) (originally pub. 1926); English translation: Caesar, *Gallic War*, ed. W. A. McDevitte and W. S. Bohn (Harper's New Classical Library; 1st edn., New York: Harper & Brothers, 1869).

```
      \lem{consilio}
      \rdg[wit={T, U}, alt=conc-]{concilio}}.
  \end{edition}
  \begin{translation}
    \ekddiv{head=XIII, depth=2, n=6.13, type=section}
      Throughout all Gaul there are two orders of those men who are of
      any rank and dignity: for the commonality is held almost in the
      condition of slaves, and dares to undertake nothing of itself,
      and is admitted to no deliberation.
  \end{translation}
\end{alignment}
```

XIII. In omni Gallia eorum hominum qui aliquo sunt numero atque honore genera sunt duo. Nam plebes paene seruorum habetur loco, quae nihil audet per se, nullo adhibetur consilio.

XIII. Throughout all Gaul there are two orders of those men who are of any rank and dignity: for the commonality is held almost in the condition of slaves, and dares to undertake nothing of itself, and is admitted to no deliberation.

2 aliquo α] in al- β **4** nihil audet (aut et A^1) per se AM] nihil habet per se RSLN per se nihil audet β nullo α] nulli β **5** consilio] conc- T U.

Rem. 1 As can be seen from the apparatus entry related to l. 4 above, a subvariant has been inserted in the lemma part: "(aut et A^1)". This was done by using `alt` in listing 5 on the previous page, ll. 9–10. But as this variant is already recorded—and printed—in the lemma part, it was necessary to remove the entire otherwise redundant variant from the apparatus criticus in print. Hence the use of `nordg` at l. 11.

Rem. 2 For examples of abbreviations, see ll. 6 and 17.

Rem. 3 Line 17 shows how mss. T and U (which belong to two distinct subfamilies) have been separated from one another: `wit={T,␣U}`. See above on page 11 for more information on this technique.

Finally, the corresponding `TEI xml` output follows:—

```
<div xml:id="div-edition_1" xml:lang="la">
  <div type="section" n="6.13">
    <head>XIII</head>
    <p>In omni Gallia eorum hominum qui
    <app>
      <lem wit="#A #M #B #R #S #L #N">aliquo</lem>
      <rdg wit="#T #f #U #l">in aliquo</rdg>
    </app>sunt numero atque honore genera sunt duo. Nam
    plebes paene seruorum habetur loco, quae
    <app>
      <lem wit="#A #M">nihil audet per se</lem>
      <rdg wit="#A1">nihil aut et per se</rdg>
      <rdg wit="#R #S #L #N">nihil habet per se</rdg>
      <rdg wit="#T #f #U #l">per se nihil audet</rdg>
    </app>,
    <app>
      <lem wit="#A #M #B #R #S #L #N">nullo</lem>
      <rdg wit="#T #f #U #l">nulli</rdg>
    </app>adhibetur
    <app>
      <lem>consilio</lem>
      <rdg wit="#T #U">concilio</rdg>
```

```
    </app>.</p>
  </div>
</div>
<div xml:id="div-translation_1" xml:lang="en">
  <div type="section" n="6.13">
    <head>XIII</head>
    <p>Throughout all Gaul there are two orders of those men
    who are of any rank and dignity: for the commonality is
    held almost in the condition of slaves, and dares to
    undertake nothing of itself, and is admitted to no
    deliberation.</p>
  </div>
</div>
```

3.1 Alignment of Several Texts

As described above on page 14, the `alignment` environment may receive an optional argument in which the following "name=value" arguments are accepted:—

`tcols` `tcols`=⟨*number*⟩ `Default: 2`

`tcols` stores the total number of columns of text to be aligned.

`lcols` `lcols`=⟨*number*⟩ `Default: 1`

`lcols` stores the number of columns to be printed on the left-hand page, *out of the total number* of columns specified with `tcols`. As can be seen from the preceding two default values, `alignment` initially sets two columns of text on facing pages. Of course, for this setting to work properly, one must ensure that the `alignment` environment is started on a left page.

`texts` `texts`=⟨*semicolon-separated values*⟩ `Default: edition;translation`

Depending on the total number of columns that has been specified with `tcols` above, `texts` is then used to define the names of the environments that shall receive edition texts, translations, *&c.* Furthermore, as described on page 15, ekdosis also defines "starred" versions of these environments to be used to synchronize columns so that corresponding paragraphs are printed vertically aligned. Some very important points need to be emphasized in this respect:—

(a) Only unaccented letters of the alphabet (whatever the case) are allowed to compose the names of LaTeX environments.

(b) These names must be separated from one another by *semicolons*, as shown in red in the listing below at the end of lines 1 and 2.

The colon at the end of line 3 closes the whole value of `text` and acts as a higher level separator.

(c) Each name may be followed by a 'suboptional' argument between square brackets which will then be used to insert `TEI xml` attributes in the corresponding `<div>` element. For example,

```
1  texts=latin[xml:lang="la"];
2        english[xml:lang="en"];
3        french[xml:lang="fr"],
```

will be converted into `TEI xml` as follows:—

```
<div xml:id="div-latin_1" xml:lang="la">
...
```

```
</div>
<div xml:id="div-english_1" xml:lang="en">
...
</div>
<div xml:id="div-french_1" xml:lang="fr">
...
</div>
```

As can be seen, ekdosis takes care of computing and inserting the `xml:id` attributes which are therefore not accepted in the 'suboptional' arguments of `texts`.

(d) The names of the environments must be specified in exactly the same order as they are supposed to appear in the print edition, from left to right.

apparatus `apparatus=`⟨*semicolon-separated values*⟩ `Default: edition`

Then, the `apparatus` option, just as `texts`, takes a semicolon-separated list of previously defined environments that shall receive at least one layer of apparatus criticus.

paired `paired=true|false` `Default: true (initially not set)`

This named argument does not need a value as it defaults to `true` if it is used. By default, ekdosis follows the LaTeX page numbering scheme when multiple texts are arranged on facing pages. The `paired` option leaves every right-hand page number unchanged, so that both facing pages hold the same page number.

lineation `lineation=page|document` `Default: document`

This option applies to edition texts initially set to receive an apparatus criticus. By default, lines are continuously numbered throughout the document. `lineation=page` sets the numbering to start afresh at the top of each page.

flush `flush=true|false` `Default: false`

This named argument does not need a value as it defaults to `true` if it is used. This option applies when two or more distinct `alignment` environments are started on the same page. Should this happen, any subsequent `alignment` environment must be set with the `flush` option so that every one of them carry its own apparatus criticus.

As an example, the alignment of the Latin edition text of Caesar's *Gallic War*, printed on left-hand pages, along with two translations into English and French, printed on right-hand pages, can be set as follows:—

```
\begin{alignment}[tcols=3,
                  lcols=1,
                  texts=latin[xml:lang="la"];
                        english[xml:lang="en"];
                        french[xml:lang="fr"],
                  apparatus=latin,
                  lineation=page]
  \begin{latin}
    Gallia est omnis divisa in partes tres quarum unam incolunt
    Belgae, [...]
  \end{latin}
  \begin{english}
    All Gaul is divided into three parts, one of which the Belgae
    inhabit, [...]
  \end{english}
  \begin{french}
    L'ensemble de la Gaule est divisé en trois parties: l'une est
    habitée par les Belges, [...]
```

```
  \end{french}
\end{alignment}
```

\SetAlignment `\SetAlignment{`⟨*alignment settings*⟩`}`
If the same alignment settings are to be shared by several `alignment` environments, common settings can be collected in the argument of `\SetAlignment`, like so:—

```
\SetAlignment{
  tcols=3,
  lcols=1,
  texts=latin[xml:lang="la"];
        english[xml:lang="en"];
        french[xml:lang="fr"],
  apparatus=latin,
  lineation=page
}
\begin{alignment}
  ...
\end{alignment}
```

`\SetAlignment` can be used either in the preamble or at any point of the document to set or to modify alignment settings.

3.1.1 Appending Hooks to Environments

\AtBeginEnvironment Once environments corresponding to texts to be aligned have been defined, it is advisable to use the `\AtBeginEnvironment{`⟨*environment*⟩`}{`⟨*code*⟩`}` command that is provided by the etoolbox package[15] to further adjust languages, hyphenation rules, and/or fonts to be applied in each environment. To return to the example provided above, once `\SetAlignment` has been used, the languages can be set as follows:—

```
\AtBeginEnvironment{latin}{\selectlanguage{latin}}
\AtBeginEnvironment{english}{\selectlanguage{english}}
\AtBeginEnvironment{french}{\selectlanguage{french}}
```

4 Laying Out the Apparatus Criticus

4.1 General Hooks

Some hooks are shared by all layers of notes that are inserted in the apparatus criticus (e.g. sources, testimonia, variant readings *&c.*)

\SetHooks `\SetHooks{`⟨*csv list of hooks*⟩`}` can be used either in the preamble or at any point of the document. The list of accepted hooks at the time of writing follows:—

appfontsize `appfontsize`=⟨*command*⟩ `Default: \footnotesize`
This option sets the size of the font to be used in the whole apparatus criticus. By default, it is the same as the size used for footnotes.

refnumstyle `refnumstyle`=⟨*command*⟩ `Default: \bfseries`
`refnumstyle` can be used to set the family, series or shape of the font used to print references to line numbers in the apparatus criticus. By default, numbers are printed in

[15] This package is loaded by ekdosis.

bold face. As an example, `refnumstyle=\normalfont` will have them printed in the font and shape selected by default for the document, while `refnumstyle=\bfseries\itshape` will have them printed in bold and italic.

postrefnum `postrefnum`=⟨*command* | *chars*⟩ Default: `~`

`postrefnum` can be used to set what immediately follows the reference to line numbers. By default, it is `~`, namely an unbreakable space. As an example, `postrefnum=\hskip 0.5em` will insert a 0.5 em space between the numerals and the beginning of all subsequent notes.

4.2 Single-Layer Apparatus Criticus

Specific Commands Single-layer apparatus criticus can be laid out in a variety of ways with the following specialized commands, all of which can be used in the preamble or at any point of the document:—

`\SetLTRapp` `\SetRTLapp` `\SetLTRapp` and `\SetRTLapp` are two argument-less commands to set the direction of the apparatus criticus, either left-to-right or right-to-left.

`\SetSeparator` `\SetSeparator{`⟨*separator*⟩`}` is used to change the separator between lemma texts and variants readings. By default, the separator is a closing square bracket followed by a space (`]␣`).

`\SetBeginApparatus` `\SetBeginApparatus{`⟨*characters*|*commands*⟩`}` can be used to append ⟨*characters*⟩ or ⟨*commands*⟩ at the beginning of the apparatus block. By default, nothing is appended. For instance, `\SetBeginApparatus{\textbf{Apparatus:}}` will append "**Apparatus:**" at the beginning of the apparatus block, while `\SetBeginApparatus{\hskip 1em}` will set an indentation of one em.

`\SetEndApparatus` `\SetEndApparatus{`⟨*characters*⟩`}` can be used to append ⟨*characters*⟩ at the end of the apparatus block. By default, nothing is appended. As an example of use, `\SetEndApparatus{.}` will have a period printed at the end of the apparatus as it is customary in some editions.

`\SetUnitDelimiter` `\SetUnitDelimiter{`⟨*delimiter*⟩`}` can be used to set the delimiter between entries in the apparatus criticus. By default, there is no delimiter except a simple space. ⟨*delimiter*⟩ can be a broad space (such as `\hskip 0.75em` for instance as in the OCT series) or the divider-sign (‖, as in the Budé series).

`\SetDefaultRule` By default, ekdosis draws a separating line between the edition text and the apparatus criticus. This line is initially defined as `\rule{0.4\columnwidth}{0.4pt}`. `\SetDefaultRule{`⟨*line definition*⟩`}` can be used in the preamble or at any point of the document to change the default setting. Leaving this argument empty as in `\SetDefaultRule{}` removes the line.

`\SetApparatus` **General Command** `\SetApparatus{`⟨*csv list of apparatus settings*⟩`}`

Finally, all the settings described above can also be collected in the argument of `\SetApparatus`. `\SetApparatus` accepts the following list of comma-separated `key=value` options:—

direction `direction`=`LR`|`RL` Default: `LR`

The writing direction of the apparatus criticus, either left-to-right (`LR`) or right-to-left (`LR`).

sep `sep`=⟨*command* | *chars*⟩ Default: `]␣`

The separator between lemma texts and variant readings.

delim `delim`=⟨*delimiter*⟩ Default: not set

The delimiter between entries in the apparatus criticus. As said above, there is no default delimiter except a simple space.

bhook `bhook`=⟨*characters*|*commands*⟩ Default: empty

The characters or commands to be appended at the beginning of the apparatus block.

ehook `ehook=`⟨*characters*⟩ `Default: empty`

The characters to be appended at the end of the apparatus block.

rule `rule=`⟨*command*⟩`|none` `Default: \rule{0.4\columnwidth}{0.4pt}`

As described above, `rule` is used to draw the separating line between the edition text and the apparatus criticus. `rule=none` can also be used to remove the line.

norule `Default: not set`

`norule` does not accept any value and has the same effect as `rule=none`.

As an example, an apparatus criticus with references to line numbers printed in normal font, a colon as a separator between lemma texts and variant readings, a broad space as a delimiter between entries and a 0.7 in line above could be laid out as follows:—

```
\SetHooks{
  refnumstyle=\normalfont
}
\SetApparatus{
  sep={: },
  delim=\hskip 1em,
  rule=\rule{0.7in}{0.4pt}
}
```

\footnoteruletrue
\footnoterulefalse

Footnote Separator As already seen above, ekdosis takes care of drawing a separating line between the edition text and the apparatus criticus. Therefore, it may be not desirable to have the standard LaTeX "footnoterule" printed on every page where regular footnotes are found. `\footnoterulefalse` removes it while `\footnoteruletrue` leaves it untouched. The latter is set by default.

4.3 Multiple-Layer Apparatus Criticus

As said above in (b) on page 4, ekdosis can print edition texts equipped with multiple-layer apparatus criticus. To take an example, most classical editions provide at least two layers of notes: one to collect references to testimonia or parallel passages (apparatus testium) and the other to record variant readings (the apparatus criticus *stricto sensu*). The former is always printed above the latter.

The default single-layer apparatus criticus that is described above in sect. 4.2 on the preceding page is called `default` internally. If any additional layer of notes be declared in the preamble, this `default` layer must be included in the list of declared layers.

\SetDefaultApparatus `\SetDefaultApparatus{`⟨*name*⟩`}` can be used at any point of the document to change the default name that is used by ekdosis.

4.3.1 Declaring Additional Layers

\DeclareApparatus `\DeclareApparatus{`⟨*name*⟩`}[`⟨*csv list of apparatus settings*⟩`]` is a preamble-only command. As a mandatory argument, it takes the name of the new layer of notes to be inserted in the apparatus block. Declared layers are then printed one below the other in the exact same order as they are declared in the preamble. Therefore, one additional layer meant to print the testimonia above the variant readings (apparatus testium) can be declared as follows:—

```
% preamble:
\DeclareApparatus{testium}
\DeclareApparatus{default}
```

In this example, `testium` is a new name for `default`, as said just above, is already known to ekdosis and used as the default layer of notes. Furthermore, as `testium` is declared before `default`, ekdosis will print the testimonia at the top of the apparatus block.

4.3.2 Laying Out Layers With The Optional Argument of `\DeclareApparatus`

direction
sep
delim
bhook
ehook
rule
norule

With regard to layout, any declared layer inherits the defaut values described above in sect. 4.2 on page 20. That said, as the optional argument of `\DeclareApparatus` accepts the exact same `key-value` options as `\SetApparatus` described on pages 20–21, ekdosis provides a straightforward mechanism to have any layer printed in a distinct layout.

To return to the example provided on the preceding page, one could keep the same settings as above for the variant readings, declare an apparatus testium with a closing square bracket as a separator and finally remove the line between the testimonia and the variant readings like so:—

```
\SetHooks{
  refnumstyle=\normalfont
}
\DeclareApparatus{testium}[
  sep={] },
  delim=\hskip 1em,
  rule=\rule{0.7in}{0.4pt}
]
\DeclareApparatus{default}[
  sep={: },
  delim=\hskip 1em,
  norule
]
```

Limiting the Number of Entries per Page In some instances, it can be useful to set a limit to the number of entries per page that a given layer of critical notes may accept, notably when entries are so abundant in number that ekdosis may oscillate indefinitely between different sets of page decisions without being able to settle down.

maxentries

`maxentries`=⟨*n*⟩ (where $n \geq 10$) `Default: not set`

If `maxentries`=⟨*n*⟩ be set, then ekdosis will issue `\pagebreak` (namely `\penalty-10000`) just after the n^{th} entry has been inserted in the layer of the apparatus criticus this option is related to. As a result, the page will actually break at the end of the current line. The particulars of this technique will be discussed below in sect. 9 on page 35.

5 Inserting Notes in Multiple-Layer Apparatus

As said above in sect. 4.3 on the preceding page, ekdosis initially sets one layer of notes that is called the "`default`" layer. As a result, any note inserted within the argument of `\app{}` as described on page 10 will go into that layer of the apparatus, unless `\SetDefaultApparatus` has been used to set another name for the default layer (see above on the preceding page).

5.1 Variant Readings

In most cases, all variant readings go into the "`default`" layer of the apparatus criticus. But in some other cases, for example when the manuscripts used refer to different recensions, it may happen that one wishes to record the related variants in separate layers. As already described on page 10, the `type` optional argument of the `\app` command can be used to insert lemma texts and associated variants in any other 'declared' layer of the apparatus criticus.

The following example assumes that some edition text is received in two different recensions and the variant readings that belong to the first recension are recorded in the default layer of notes while those of the second recension are to be printed in a second layer, below the default one. First, both layers must be declared in the preamble in sequence, like so:—

```
\DeclareApparatus{default} % default layer
\DeclareApparatus{rec2} % additional layer below the default one
```

If one wishes to refer to `rec1` as the default layer, then `\SetDefaultApparatus` must be used, like so:—

```
\SetDefaultApparatus{rec1}
\DeclareApparatus{rec1} % new layer set as default
\DeclareApparatus{rec2} % additional layer below the default one
```

Then, whatever option has been chosen, lemma texts and variants inserted with `\app{}` will go into the upper, default layer of notes, while those inserted with `\app[type=rec2]{}` will go into the lower one:—

```
Some \app{
  \lem{word}
  \rdg{reading}
} to go into the default layer of notes.

Some \app[type=rec2]{
  \lem{note}
  \rdg{comment}
} to be recorded as part of the second recension.
```

At any rate, `type=default` or `type=rec1`, depending on what has been chosen, must be used if the editor wishes to retain that information in the `TEI xml` output file.

5.2 Other Notes for Comments, Sources or Testimonia

Additional layers of notes can be used to print short comments or to record references to texts quoted by the author of the edited text or references to the edited text by other authors or translators. The former set is called an *apparatus fontium* while the latter is called an *apparatus testium*.


From a technical standpoint, these notes are very different from the short editorial notes inserted between lemma texts and variant readings that have been described above on page 12. However, for the sake of consistency with `TEI xml` encoding, ekdosis uses the same command `\note` to insert both kinds of notes.


One must also keep in mind that the notes that are described in this section refer either to a single word or to a span of text. By consequence, as boundaries must always be

set outside spans of text, notes must be inserted immediately before the word or words they are related to. As a result of this rule, all spaces subsequent to `\note` are ignored.

`\note` `\note[⟨options⟩]{⟨text⟩}`

As said above, `\note`, when found outside `\app{}`, is used to insert in additional layers of the apparatus short comments or references to texts quoted or cited in the edition text. It accepts the following comma-separated list of `key-value` optional arguments:—

`type` `type`=⟨*type*⟩

`type` is used to specify the name of the layer where the note is to be printed.[16]

`sep` `sep`=⟨*command* | *chars*⟩

The separator between the lemma text and the contents of the note.

`nosep` `nosep`=`true|false`

This named argument does not need a value as it defaults to `true` if it is used. Obviously, `nosep` removes the separator mentioned above.

`lem` `lem`=⟨*lemma text*⟩

`lem` is the span of text the note is about. It may consist of one or more words, or of an abridged lemma text.

`labelb` `labelb`=⟨*label*⟩ `Mandatory`

`labelb` is the unique label to serve as a reference for the point immediately preceding the lemma text.

`labelb` is used by ekdosis to print the line numbers in the apparatus criticus and to set the `left()` XPointer should `TEI` output be required. Therefore, it must be specified. Otherwise, ekdosis will issue an error message.

`labele` `labele`=⟨*label*⟩

`labele` is the unique label to serve as a reference for the point immediately following the lemma text. Contrary to `labelb`, `labele` may be left unspecified if the note is only about one word. If it is about a span, then `labele` ought to be specified.

`\linelabel` `\linelabel{⟨label⟩}`

If `labele`=⟨*some_label*⟩ be specified in the optional argument of `\note`, `\linelabel{`⟨*some_label*⟩`}` must be inserted immediately after the span of text that the note is about so that ekdosis can locate the exact point where the lemma text addressed by the note ends, like so:—

```
% Preamble:
% \DeclareApparatus{fontium}[
%         delim=\hskip0.75em,
%         bhook=\textbf{Sources:},
%         ehook=.]
% \DeclareApparatus{default}[
%         delim=\hskip0.75em,
%         ehook=.]
% Document:
\begin{ekdosis}
  The oldest monument of the Germans is their language, which, before
  untold centuries, was the companion of their travels from central
  Asia; a language, copious, elastic, inviting self-explaining
  combinations and independent development; lending itself alike to
  daily life and imagination, to description and abstract thought.
  \note[type=fontium, labelb=61e, labele=62a, lem={They
    had... slave}]{Waitz, \emph{Deutsche Verfassungs Geschichte},
    i. 86} They had a class of nobles, but their tongue knew no word
```

[16] See sect. 4.3.1 on page 21 to learn how to declare and lay out new layers of notes.

```
  for slave.\linelabel{62a}\footnote{George Bancroft, \emph{History of
      the United States from the Discovery of the American Continent},
    II.61--2.}
\end{ekdosis}
```

PDF output:—

The oldest monument of the Germans is their language, which, before untold centuries, was the companion of their travels from central Asia; a language, copious, elastic, inviting self-explaining combinations and independent development; lending itself alike to daily life and imagination, to description and abstract thought. They had a class of nobles, but their tongue knew no word for slave.[17]

Sources: 4–5 They had... slave] Waitz, *Deutsche Verfassungs Geschichte*, i. 86.

TEI xml output:—

```
<p>The oldest monument of the Germans is their language,
which, before untold centuries, was the companion of their
travels from central Asia; a language, copious, elastic,
inviting self-explaining combinations and independent
development; lending itself alike to daily life and
imagination, to description and abstract thought.
<note type="fontium" target="#range(right(61e),left(62a))">Waitz,
<emph>Deutsche Verfassungs Geschichte</emph>, i. 86</note>
<anchor xml:id="61e" />They had a class of nobles, but
their tongue knew no word for slave.
<anchor xml:id="#62a" />
<note place="bottom">George Bancroft,
<emph>History of the United States from the Discovery of
the American Continent</emph>, II.61--2.</note></p>
```

`\note` or `\linelabel` inside `\lem` It may happen that `\note` or `\linelabel` commands be found inside the argument of `\lem`. Obviously, inserting such commands in the apparatus criticus in print makes no sense and will lead to an error. The solution is to insert in the value of the `alt` optional argument of `\lem` a duplicate of the lemma text devoid of those commands, like so:—

```
This is some \app{
  \lem[alt=dummy]{\note[type=fontium, labelb=bnote, labele=enote,
    lem=dummy... command]{Text of the note}
    dummy}
  \rdg{pseudo}}
text to demonstrate how to insert a note in the argument of the
\emph{lem} command.\linelabel{enote}
```

[17] George Bancroft, *History of the United States from the Discovery of the American Continent*, II.61–2.

PDF output:—

This is some dummy text to demonstrate how to insert a note in the argument of the *lem* command.

Sources: 1–2 dummy... command] Text of the note.

1 dummy] pseudo.

`TEI xml` output:—

```
<p>This is some
<app>
  <lem>
  <anchor xml:id="bnote" />dummy</lem>
  <note type="fontium"
  target="#range(right(bnote),left(enote))">Text of the
  note</note>
  <rdg>pseudo</rdg>
</app>text to demonstrate how to insert a note in the
argument of the
<emph>lem</emph>command.
<anchor xml:id="#enote" /></p>
```

As can be seen from the `TEI xml` output above, the span of text the note is about has been carefully delimited by two anchors (ll. 4 and 12), the first of which falls within `<lem>` (l. 4), but ekdosis has taken care of moving the note itself out of this element (ll. 5–7). Otherwise, the `TEI` output would not be valid.

6 Lineation Settings

ekdosis uses lineno internally for line numbering.[18] But it must be noted that ekdosis strictly prohibits the "pagewise" mode of operation that is provided by lineno. As a result of this hinderance, all "margin switching" functions of lineno are disabled within the environments that are specific to ekdosis, viz. `ekdosis` and `alignment`.

That said, ekdosis provides equivalents of its own to handle the line numbers the same way as lineno's "pagewise" mode of operation does.

`\SetLineation` `\SetLineation{`⟨*csv list of options*⟩`}` may be used in the preamble or at any point of the document to set lineation preferences. Its argument processes the `key=value` options that follow:—

`lineation` `lineation=page|document` `Default: document`

`lineation=document` has the lines numbered continuously throughout the document while `lineation=page` instructs ekdosis that the numbering should start afresh at the top of each page.

`modulo` `modulo` `Default: not set`

`modulo` does not accept any value. When this option is set, every fifth line is numbered.

`modulonum` `modulonum=`*n* (where *n* is an integer) `Default: not set`

`modulonum` allows to modify the interval between the numbers that are printed. `modulo`

[18] Uwe Lück and Stephan Böttcher, *The Lineno package* (version 4.41) [Line numbers on paragraphs] (Nov. 2, 2005), http://www.ctan.org/pkg/lineno.

must be set for this option to have effect. As examples, `modulo, modulonum=3` has every third line numbered and `modulonum=1` disables modulo numbering.

`margin` `margin=right|left|inner|outer` Default: left

`margin` sets the margin in which the line numbers are to be printed.

`numbers` `numbers=elided|full` Default: elided

This option only has effect on the numbers that are printed in the apparatus criticus. `numbers=elided` applies on spans of numbers and elides the last number of a range to the fewest number of figures possible—viz. 35–7, 129–31 *&c.*—without eliding digits in the group 10 to 19 in each hundred—viz. 17–19, 115–18 *&c.* `numbers=full` leaves the numbers untouched.

`\innerlinenumbers` `\outerlinenumbers` `\innerlinenumbers` and `\outerlinenumbers` are equivalent to `\SetLineation{numbers=outer}` and `\SetLineation{numbers=inner}` respectively. Both commands are complementary to `\rightlinenumbers` and `\leftlinenumbers` already provided by the lineno package.

Useful Lineation Commands As implied above, pretty much all commands that are provided by the "running" mode of operation of the lineno package will work with ekdosis, notably the following:—

`\modulolinenumbers` `\modulolinenumbers[`⟨*n*⟩`]` can be used to enable modulo line numbering as described above.

`\resetlinenumber` `\resetlinenumber[`⟨*n*⟩`]` resets the line number to one or to *n* if specified.

`\linenumberfont` `\renewcommand{\linenumberfont}{`⟨*commands*⟩`}` can be used to set the font used for the line numbers that are printed in the margins. By default, the definition is `\normalfont\footnotesize`.

`\linenumbersep` `\linenumbersep` is the distance between the numbers and the margin. By default, this distance is set to 10 pt. It can be redefined like so: `\setlength\linenumbersep{`⟨*length*⟩`}`.

`\linelabel` `\lineref` `\linelabel{`⟨*label*⟩`}` sets a line label that can be referred to with `\lineref{`⟨*label*⟩`}`.

The reader is invited to refer to the documentation of the lineno package for more information.

As an example, what follows has every fifth line number printed in the inner margins. Additionally, the numbering shall start afresh at the top of each page:—

```
\SetLineation{
  lineation=page,
  modulo,
  margin=inner
}
```

7 Languages

ekdosis is fully compatible with babel. "Fully compatible" means that all features provided by babel, including language switching commands, are supported by ekdosis. ekdosis is also compatible with polyglossia with one notable exception: luabidi, which polyglossia loads for languages written from right to left, is not supported by ekdosis, and most probably never will be. That said, as far as the author could see, single-layer apparatus, as described in sect. 4.2 on page 20, can be typeset within the Arabic environment that is provided by polyglossia. Unfortunately, the same cannot be said for multi-layer apparatus.

Whether babel or polyglossia is used, ekdosis automatically applies the current language to the entries of the apparatus criticus, including the fonts that may have been associated

to the languages in the preamble. In this respect, as polyglossia can use the same language switching commands as babel,[19] the general advice given above in sect. 3.1.1 on page 19 applies in all cases.

7.1 Languages Written From Right to Left

As said above, polyglossia is not supported by ekdosis for languages that are written and read from right to left, like Arabic, Hebrew or Syriac. However, as babel is supported and can be loaded concurrently with polyglossia, an easy way is to use babel to print such languages.

The reader is invited to refer to and become acquainted with the relevant parts of the documentation of the babel package.[20]

babel Only In the following example, babel is used exclusively to set three different languages: Arabic, ancient Greek and English:—

Listing 6: Multilingual editions with babel only

```
1  \usepackage{fontspec}
2
3  \usepackage[greek.ancient,english]{babel}
4  \babelprovide[onchar=fonts]{arabic}
5
6  \babelfont{rm}{Old Standard}
7  \babelfont[greek]{rm}[RawFeature={+ss05;+ss06}]{Old Standard}
8  \babelfont[*arabic]{rm}{Amiri}
9
10 \babeltags{ancientgreek = greek}
11 \newcommand{\sg}[1]{\textancientgreek{#1}}
12
13 \newcommand{\RL}[1]{\bgroup\textdir TRT#1\egroup}
14 \newenvironment{Arabic}{\par\pardir TRT\textdir TRT}{\par}
```

Rem. 1 As can be seen, fontspec has been loaded before babel. To the author's knowledge, this gives better results when `\babelfont` is used.

Rem. 2 Line 3 loads babel and instructs it to use English as the default language and ancient Greek as a second optional language. The built-in `bidi` mechanism provided by babel is not enabled. As a result, specific language switching commands for Arabic must be defined just as it must be for every other language.

Rem. 3 Line 4 does not load any Arabic, but instructs babel that it should use the Arabic font that is set below with `\babelfont` whenever an Arabic letter is encountered.

Rem. 4 Lines 6–8 select the fonts: `Old Standard` is the default font to be used for Roman shape (l. 6); the same font is used for Greek, with some additional Open Type features enabled; finally, the `Amiri` font is used for Arabic.

Rem. 5 Lines 10–11 define so-called "tags" for easier access to ancient Greek through `\begin{ancient greek}` ... `\end{ancientgreek}` for running paragraphs and `\textancientgreek{`⟨*text*⟩`}` for short insertions of Greek in English text. `\sg{`⟨*text*⟩`}` is just a shorthand for this latter command.

Rem. 6 Finally, lines 13–14 define simple language switching commands for Arabic. As can be seen, no commands other than the LuaTEX primitives `\pardir` and `\textdir` have been used for babel already takes care of selecting the Arabic font. `\RL` is for short insertions of Arabic words in English paragraphs while `\begin{Arabic}` ... `\end{Arabic}` is for running paragraphs of Arabic text.

[19] See François Charette and Arthur Reutenauer, *The Polyglossia package* (version 1.49) [An alternative to babel for XeLaTeX and LuaLaTeX] (Apr. 8, 2020), http://www.ctan.org/pkg/polyglossia, 3.2 p. 14.

[20] Javier Bezos López and Johannes L. Braams, *The Babel package* (version 3.47) [Multilingual support for Plain TeX or LaTeX] (July 13, 2020), http://www.ctan.org/pkg/babel.

\setRL
\setLR

Changing the Writing Direction `\setRL` and `\setLR` are two argument-less commands provided by ekdosis that can be used to change the writing direction of running paragraphs. The former sets the direction from right to left and the latter form left to right. If babel has been set as above, `\setRL ... \setLR` can be used in place of `\begin{Arabic} ... \end{Arabic}`.

polyglossia Associated With `\babelprovide` What follows illustrates how babel can be used conjointly with polyglossia for the same three languages as above without having to load luabidi:—

Listing 7: Multilingual editions with babel and polyglossia

```
1  \usepackage{fontspec}
2
3  \usepackage{babel}
4  \babelprovide[onchar=fonts]{arabic}
5
6  \setmainfont{Old Standard}
7  \newfontfamily\greekfont{Old Standard}[RawFeature={+ss05;+ss06}]
8  \babelfont[*arabic]{rm}{Amiri}
9
10 \usepackage{polyglossia}
11 \setdefaultlanguage{english}
12 \setotherlanguage[variant=ancient]{greek}
13
14 \newcommand{\textarabic}[1]{\bgroup\textdir TRT#1\egroup}
15 \newenvironment{Arabic}{\par\pardir TRT\textdir TRT}{\par}
```

Rem. 1 Line 3 just loads babel with no default language.
Rem. 2 Lines 4 and 8 are used to have the Arabic font automatically selected as above.
Rem. 3 Lines 14–15 define the exact language switching commands that would have been defined if polyglossia and luabidi had been used for Arabic.

As one can see, the important points about languages written from right to left are to use babel only to select the Arabic fonts, avoid using the bidirectional mechanism it provides and define commands and environments that use only LuaTEX primitives to set the writing direction. Then, an Arabic edition text—to continue with this example—can be entered as plainly as follows:—

```
\begin{ekdosis}
  \begin{Arabic}
    إِنَّ أَبِي كَانَ مِنَ \app{
      \lem{ٱلْمُقَاتَلَة}
      \rdg{ٱلْمُقَاتِلِينَ}
      } وَ كَانَتْ أُمِّي مِنْ عُظَمَآءِ بُيُوتِ ٱلزَّمَازِمَة۔
  \end{Arabic}
\end{ekdosis}
```

It should be reminded that the writing direction of the apparatus criticus itself is independent of that of the edition text and must be set either with `\Set(LTR|RTL)app` or with the `direction` optional argument of `\SetApparatus` for single-layer apparatus criticus, or by means of `\DeclareApparatus` for multiple-layer apparatus criticus.[21]

[21] See above sect. 4.2 on page 20 (single-layer apparatus criticus) and sect. 4.3 on page 21 (multiple-layer apparatus criticus).

The PDF output with left-to-right apparatus criticus follows:—

إِنَّ أَبِي كَانَ مِنَ ٱلْمُقَاتِلَةِ وَكَانَتْ أُمِّي مِنْ عُظَمَآءِ بُيُوتِ ٱلزَّمَازِمَةِ.

1 ٱلْمُقَاتِلِينَ [ٱلْمُقَاتِلَةِ

And here follows the PDF output with right-to-left apparatus criticus:—

إِنَّ أَبِي كَانَ مِنَ ٱلْمُقَاتِلَةِ وَكَانَتْ أُمِّي مِنْ عُظَمَآءِ بُيُوتِ ٱلزَّمَازِمَةِ.

1 ٱلْمُقَاتِلَةِ] ٱلْمُقَاتِلِينَ

7.2 Using arabluatex

arabluatex is a LuaLaTeX package that provides commands and environments which return Arabic writing from an ASCII transliteration (either ArabTeX or Buckwalter scheme).[22] It is particularly well-suited for complex documents such as critical editions where a lot of commands intertwine with Arabic writing. arabluatex can output Unicode Arabic in the same modes as arabtex[23] or in different accepted standards of romanization. It is also able to produce a duplicate of the original `.tex` source file in which all `arabtex` or `buckwalter` strings are replaced with Unicode equivalents, either in Arabic script or in any accepted standard of transliteration.[24]

arabluatex is fully supported by ekdosis. The following example illustrates how arabluatex and ekdosis interact with each other to produce distinct `TEI xml` outputs from a single `.tex` source file:—

Listing 8: ekdosis and arabluatex

```
% Preamble:
% load ekdosis and ask for TEI xml output:
\usepackage[teiexport]{ekdosis}
% load arabluatex and request a LaTeX ouput with Unicode Arabic:
\usepackage[export,fullvoc]{arabluatex}

% document:
\begin{arabexport} % export arabtex strings to Unicode Arabic
  \begin{ekdosis}
    \begin{arab}
      'inna 'abI kAna mina
      \app{
        \lem{'l-muqAtilaTi}
        \rdg{'l-muqAtilIna}
      }
      wa-kAnat 'ummI min `u.zamA'i buyUti 'l-zamAzimaTi.
```

[22] Robert Alessi, *The Arabluatex package* (version 1.20) [ArabTeX for LuaLaTeX] (Mar. 23, 2020), http://ctan.org/pkg/arabluatex.

[23] Klaus Lagally, *The Arabtex package* (version 4.00) [Macros and fonts for typesetting Arabic] (Mar. 11, 2004), http://baobab.informatik.uni-stuttgart.de/ifi/bs/research/arab_e.html.

[24] Alessi, *The Arabluatex package*, see n. 22, "Exporting Unicode Arabic to an External File."

```
    \end{arab}
  \end{ekdosis}
\end{arabexport}
```

The PDF output with left-to-right apparatus criticus is of course the same as above:—

إِنَّ أَبِي كَانَ مِنَ ٱلْمُقَاتِلَةِ وَكَانَتْ أُمِّي مِنْ عُظَمَآءِ بُيُوتِ ٱلزَّمَازِمَةِ.

ٱلْمُقَاتِلِينَ [ٱلْمُقَاتِلَةِ **1**

However, assuming that the source file is called `source.tex`, ekdosis produces as instructed from this file an additional `source-tei.xml` as follows:—

```
<p xml:lang="ar-Latn" type="transliterated"
subtype="arabtex">'inna 'abI kAna mina
<app>
  <lem>'l-muqAtilaTi</lem>
  <rdg>'l-muqAtilIna</rdg>
</app>wa-kAnat 'ummI min `u.zamA'i buyUti
'l-zamAzimaTi.</p>
```

At the same time, arabluatex is instructed to produce on its own from the same `source.tex` an additional `source_out.tex` in which all `arabtex` strings found within `\begin{arabexport}` ... `\end{arabexport}` (see listing 8 on the preceding page, ll. 9–19) are replaced with full-vocalized Arabic Unicode script. Finally, compiling this latter file produces the following `sample-arabic_out-tei.xml` an extract of which follows:—

```
<p xml:lang="arb">إِنَّ أَبِي كَانَ مِنَ
<app>
  <lem>ٱلْمُقَاتِلَةِ</lem>
  <rdg>ٱلْمُقَاتِلِينَ</rdg>
</app>وَكَانَتْ أُمِّي مِنْ عُظَمَآءِ بُيُوتِ
ٱلزَّمَازِمَةِ.</p>
```

The reader will find the full `arabic-sample.tex` source file with instructions in sect. 15 on page 62, and is invited to refer to the documentation of the arabluatex package for more information on the way to use its Arabic environments and built-in functions dedicated to export `arabtex` ASCII strings to Unicode.[25]

8 Divisions of the Body

The features that are described in this section call for one general remark. ekdosis is designed to figure out where any LaTeX command that is converted to a `TEI` opening element allowed to nest recursively, such as `<div>`, `<lg>` and the like, is to be closed, even though there is no explicit indication of the point where the closure occurs. Thoroughly scanning LaTeX source files with Lua functions which involve complex string matching and

[25] Alessi, *The Arabluatex package*, see n. 22.

recursions was required, as LaTeX 'open' commands such as `\chapter` or `\section` only act as milestones, contrary to `TEI` elements.

It must be noted that the two styles described hereinafter are mutually exclusive. `TEI xml` forbids that both be combined within a single `<body>` element.[26] As a result, ekdosis will disregard whichever one is not selected.

8.1 LaTeX Standard Divisions

ekdosis can use the LaTeX standard textual divisions, such as `\book`, `\chapter`, `\section` and the like.

However, to have these divisions properly translated into `TEI` numbered `<div>` elements, the `divs` general option must be set to `latex` explicitly—viz. `divs=latex`—as described above on page 6.

As the `alignment` environment that is provided by ekdosis places all aligned texts within `TEI xml` un-numbered `<div>` elements and LaTeX textual divisions are converted into numbered `<div`$_n$`>` elements, inserting such divisions in texts to be aligned will result in an invalid `TEI xml` output. Instead, un-numbered divisions through `\ekddiv` must be used as described below in sect. 8.2 on the next page.

Once `divs` has been set to `latex`, ekdosis converts `\book`, `\part`, `\chapter`, `\section`, `\subsection` and `\subsubsection` into corresponding `TEI` 'numbered' `<div`$_n$`>` elements, where $1 \leq n \leq 6$.

`\MkBodyDivs` **Adjusting the Levels of Textual Subdivisions** `\MkBodyDivs{`⟨*div1*⟩`}{`⟨*div2*⟩`}{`⟨*div3*⟩`}{`⟨*div4*⟩`}{`⟨*div5*⟩`}{`⟨*div6*⟩`}` takes six mandatory arguments. This command can be used in the preamble or at any point of the document to make the number of the first-level subdivision of the edition text, viz. `<div1>`, match to any LaTeX command other than `\book`. For example, if `\section` be the highest-level sectional command used, then `\MkBodyDivs{section}{subsection}{subsubsection}{}{}{}` will have `\section`, `\subsection` and `\subsubsection` converted into `<div1>`, `<div2>` and `<div3>` respectively.

Inserting Variants in Headings Variant readings can be inserted in headings. In this case, the optional argument of the LaTeX sectional command must naturally be used to prevent variants from going into headers, footers or the table of contents, like so:—

```
% Preamble:
\usepackage[teiexport=tidy, divs=latex]{ekdosis}
\MkBodyDivs{chapter}{section}{}{}{}{}

% Document:
\chapter[Ἱπποκράτους ἐπιδημιῶν βιβλίον δεύτερον]{Ἱπποκράτους ἐπιδημιῶν
  \app{
    \lem[wit={I,R,H}]{βιβλίον δεύτερον}
    \rdg[wit=V]{λόγος β'}}}

\section{<Τμῆμα πρῶτον>}
Ἄνθρακες θερινοὶ ἐν Κραννῶνι· [...]
```

`TEI xml` output:—

[26] See https://tei-c.org/release/doc/tei-p5-doc/en/html/DS.html#DSDIV.

```
<div1 type="chapter">
  <head>Ἱπποκράτους ἐπιδημιῶν
  <app>
    <lem wit="#I #R #H">βιβλίον δεύτερον</lem>
    <rdg wit="#V">λόγος β’</rdg>
  </app></head>
  <div2 type="section">
    <head>&lt;Τμῆμα πρῶτον&gt;</head>
    <p>Ἄνθρακες θερινοὶ ἐν Κραννῶνι· [...]</p>
  </div2>
</div1>
```

8.2 Using TEI Un-numbered Divisions

As already described on page 6, the un-numbered style of division is the one that is set by default. It is congruous to the general option `divs=ekdosis`.

This style provides a flexible mechanism in which format and presentation are separated from content. It is designed to meet the requirements of classical and literary texts the divisions of which may depend on many different received traditions.

\ekddiv `\ekddiv{`⟨*key-value arguments*⟩`}` is the unique sectional command provided by ekdosis. This command converts the divisions into un-numbered TEI `<div>` elements allowed to nest recursively and takes one mandatory argument in which the following `key=value` arguments are accepted:—

type `type`=⟨*name*⟩ Default: none

`type` corresponds to the TEI class `att.typed` and can be used to classify the element in which it is found in any way. Suitable values here can be `book`, `chapter`, `section` and the like.

n `n`=⟨*value*⟩ Default: none

`n` is meant to provide a number or any kind of label for the division and does not have to be unique in the document.

head `head`=⟨*name*⟩ Default: none

`head` holds the title of the division and may further contain variant readings.

barehead `barehead`=⟨*name*⟩ Default: none

`barehead` is supposed to be used to prevent unwanted commands from going into such places as headers, footers and the table of contents.

depth `depth`=⟨*n*⟩ where $1 \leq n \leq 9$ Default: 1

As TEI un-numbered divisions are simply `<div>` elements allowed to nest recursively to indicate their hierarchic depth and `\ekddiv` is an ‘open’ LaTeX command, `n` is needed to indicate the depth of the division within the hierarchy, the largest being `1` and the smallest being `9`.

toc `toc`=`|book|part|chapter|section|subsection|subsubsection|paragraph|subparagraph` Default: not set

If `toc` be set, the title of the division goes into the table of contents at the hierarchic level that is specified as value.

\FormatDiv **Formatting the Titles** By design, ekdosis does not format the titles. Instead, depending on what is needed for the edition text, `\FormatDiv{`⟨*n*⟩`}{`⟨*code before*⟩`}{`⟨*code after*⟩`}` is provided to lay out the titles of any hierarchic depth of division. This command takes three mandatory arguments as follows: ⟨*n*⟩, which is the number referring to the particular depth of division to be formatted and some LaTeX commands to go before and after the

title itself. The following example illustrates how the titles of the largest division can be printed horizontally centered in a larger size:—

```
\FormatDiv{1}{\begin{center}\Large}{\end{center}}
```

To elaborate on the example provided above in sect. 8.1 on page 32, here follows how the first three hierarchical levels could be formatted as un-numbered divisions:—

```
% Preamble:
\FormatDiv{1}{\begin{center}\Large}{\end{center}}
\FormatDiv{2}{\begin{center}\large}{\end{center}}
\FormatDiv{3}{\bfseries}{.}

% Document:
\begin{ekdosis}
  \ekddiv{
    head={Ἱπποκράτους ἐπιδημιῶν
      \app{
        \lem[wit={I,R,H}]{βιβλίον δεύτερον}
        \rdg[wit=V]{λόγος β’}}},
    type=book,
    depth=1,
    n=II
  }

  \ekddiv{
    head={<Τμῆμα πρῶτον>},
    type=section,
    depth=2,
    n=II.1
  }

  \ekddiv{head=1, type=paragraph, depth=3, n=II.1.1}
  Ἄνθρακες θερινοὶ ἐν Κραννῶνι· [...]
\end{ekdosis}
```

PDF output:—

Ἱπποκράτους ἐπιδημιῶν βιβλίον δεύτερον

<Τμῆμα πρῶτον>

1. Ἄνθρακες θερινοὶ ἐν Κραννῶνι· [...]

1 βιβλίον δεύτερον IRH] λόγος β’ V.

TEI xml output:—

```
<div xml:id="div-hippocrates_1" xml:lang="grc">
  <div type="book" n="II">
    <head>Ἱπποκράτους ἐπιδημιῶν
    <app>
```

```
      <lem wit="#I #R #H">βιβλίον δεύτερον</lem>
      <rdg wit="#V">λόγος β’</rdg>
    </app></head>
    <div type="section" n="II.1">
      <head>&lt;Τμῆμα πρῶτον&gt;</head>
      <div type="paragraph" n="II.1.1">
        <head>1</head>
        <p>Ἄνθρακες θερινοὶ ἐν Κραννῶνι· [...]</p>
      </div>
    </div>
  </div>
</div>
```

9 The Tricks of the Trade

As the `.tex` source file is compiled, ekdosis has to compute a tremendous amount of data. Most of this work is performed by Lua functions. An edition text narrowed down to a single page needs to be compiled at least three times. On the first run, the apparatus criticus does not show. Instead, ekdosis produces an auxiliary file named `\jobname.ekd` in which all the entries of the apparatus criticus are collected. Then, on the second run a test is performed on this auxliary file to determine whether there are entries—and if so, which ones—to be printed on the current page. At the same time, references to the line numbers are updated if necessary. Then, on the third run, the apparatus criticus is printed.

Of course, every change made to the input may similarly require LuaLaTeX to be run three more times to get everything to the right place with the right numbers.

In some instances, notably when on a given page entries are very abundant in number, specifically when the edition text is getting close to the bottom of the page, ekdosis may oscillate indefinitely between different sets of page decisions without being able to settle down. The condition may be typically illustrated as follows: after LuaLaTeX has been run, an entry is attached to the last line of the page. As said above, this entry does not show yet. But when it does, if it results in an additional line being printed in the apparatus criticus, the last line of the edition text—the one the entry was previously attached to—goes to the next page. As a result, this entry also moves to the next page with the line it belongs to. This point is literally critical, because unless a `\pagebreak` is inserted just here so as to keep the contentious line on the next page, ekdosis enters a vicious circle from which it cannot escape, not to mention that right entries with right line numbers cannot come on pages that follow a wrong page either.

An alert reader may have guessed that inserting a `\pagebreak` is a good way to get out of the vicious circle. And surely, if only a few pages are at stake, this is the way to go. However, `\pagebreak` commands should only be inserted when the whole edition text is ready for any subtantial change in the preceding pages may result in pages that break just after they begin.

Another way—should the edition text fall into the vicious circle too often—is to limit the number of entries per page that a given layer of apparatus criticus may accept as described above on page 22. As a result, ekdosis will take care of inserting automatic breakpoints between pages whenever the number of entries on a given page reaches the value set as `maxnumber`.

`maxnumber` must not be too small: otherwise offensive to look at vertical spaces may come between the edition text and the apparatus criticus. Conversely, `maxnumber` must not be too big: otherwise, should entries overflow on a given page, the edition text and the

apparatus criticus may clash. As said above, a couple of clashes can be managed with a couple of manually inserted page breaks. But if there are too many ot them, it is a good indication that the selected value of `maxentries` is too to high.

Complex edition texts do have a magic number. An advisable way to figure it out would be to start from a sample of only a few pages, selected as evidence for the complexity of the whole. As only a few pages would need to be compiled, the magic number should emerge quite rapidly.

10 `TEI xml` Output

Several examples of `TEI xml` output have been provided hitherto. Before proceeding, the reader is invited to return to every one of them. In this respect, it may be of interest to review carefully the excerpt of Caesar's *Gallic War* of which the LaTeX source file and its corresponding `TEI xml` output are printed in full below in sect. 14 on page 56. Once ekdosis has been instructed to convert the edition text into `TEI xml` (l. 11), the preamble of this file shows how to set languages and fonts to be used in the document (ll. 2–6), format the titles (l. 16) and lay out the alignment of an edition text associated with two translations (ll. 18–25) in modern languages. Furthermore, it shows how information related to each language (Latin, English and French) is to be found in two different places, namely for `TEI xml` output (ll. 21–3) and for PDF output through LaTeX (ll. 27–9). Finally, it provides examples of declaring witnesses, hands, scholars and shorthands (ll. 31–60). As to the document itself, it shows how to lay out a conspectus siglorum in a table (ll. 64–80), before giving detailed examples of how the edition text is entered (ll. 85–101) and sectional commands provided by ekdosis are used (ll. 86, 103 and 110).[27]

10.1 Requesting `TEI xml` Output

`TEI xml` output is requested by means of the `teiexport` global option as described above on page 6. Once instructed to output `TEI`, ekdosis converts and exports in sequence the contents of `ekdosis` environments (see above sect. 2.3 on page 10). As regards the contents of `alignment` environments (see above sect. 3 on page 14), ekdosis first collates the contents of the environments that have been declared as values of the `texts` optional argument of `alignment` or `\SetAlignment`,[28] then places each of the corresponding `TEI xml` outputs within distinct `<div>` elements named after the declared environments themselves. For example, to return to Caesar's text, the Latin edition text is found between a `\begin{latin}` ... `\end{latin}` environment (see the `.tex` source file, sect. 14.1 on page 56, ll. 85–101) which is declared at l. 21. Then, the corresponding `xml` output is found within a `<div>` element, the `xml:id` of which has been given by ekdosis the value `div-latin_1` (see sect. 14.2 on page 58, ll. 176–200).

`\SetTEIFilename`

`TEI` File Name `\SetTEIFilename{`⟨*basename*⟩`}` is a preamble-only command. It can be used to set the base name of the `TEI xml` output file, to which the suffix `.xml` is appended. By default, the base name is `\jobname-tei`.

[27] The PDF output is available as a separate file.

[28] See above sect. 3.1 on page 17.

10.2 General Principles

Validation of the `TEI xml` Structure The reference tool that the author relies on is that provided by the *TEI by Example Project*.[29] As for ekdosis, it is designed to produce on request, in addition to an edition in print, a `TEI xml` compliant output file. That said, one must keep in mind that the LaTeX packages that are part of TeXLive can be counted in thousands, and the commands they provide in tens of thousands. There may even be grounds in asserting that the possibilities offered by TeX and LaTeX quite exceed what can be afforded by `TEI xml`. On another hand, many LaTeX commands make no sense in `TEI`. Therefore, a sensible choice is to keep them out of the environments the contents of which are to be translated into `xml` elements, as will be illustrated by the following.

Converting a LaTeX document into `TEI xml` can be quite an intricate business. In many cases, however, LaTeX strings are found within environments or groups that are easy to convert into `TEI` equivalents: unless instructed otherwise, whether such groups are delimited by opening and closing braces or by explicit `\begin` ... `\end` commands, ekdosis translates them into `xml` so that for example `\emph{word}` and `\begin{quote}` ⟨*quoted words*⟩ `\end{quote}` become `<emph>` ⟨*word*⟩ `</emph>` and `<quote>` ⟨*quoted words*⟩ `</quote>` respectively.

But LaTeX does not place everything into groups or environments. To take here but a few examples, sectional divisions are marked in LaTeX with "open" commands such as `\chapter` or `\section` with no clear indication where the closure of divisions occurs, contrary to `TEI xml` markup with numered or un-numbered `<div>` elements allowed to nest recursively. As regards running paragraphs of text, the situation is even worse than in the latter case, as the following simple example shows:—

```
1  \begin{document}
2  \begin{ekdosis}
3    ...
4
5    ... These are the final words of some section in the body text.
6
7    \section{New Section}
8
9    Here is how some new section begins...
10
11   ... Final words.
12   \section{Other Section}
13   Opening words of the section...
14
15   ... Final words
16
17   \section{Other Section}
18   Opening words...
19
20   ... Final words.
21 \end{ekdosis}
22 \end{document}
```

Obviously, construing this LaTeX source file into `TEI xml` is a fairly complex task. For example, line 6 only closes a paragraph for line 7 opens a division (hence `</p><div1>`), line 8 only opens a paragraph just after the heading of the section (hence `</head><p>`) while

[29] Ron Van den Branden, Melissa Terras, and Edward Vanhoutte, "TEI by Example," http://www.teibyexample.org, accessed Aug. 4, 2020. The TEI validator is here: http://teibyexample.com/xquery/TBEvalidator.xq.

line 14 both closes the foregoing paragraph and opens a new one (hence `</p><p>`), contrary to line 16 which both closes a paragraph and a sectional division (hence `</p></div1>`), not to mention lines 20–1, where notwithstanding the absence of blank line or any other indication, `</p></div1></body></text></TEI>` is needed.

ekdosis has been designed to implement this task through Lua functions which involve string matching (both forward and reverse matching) and recursions.

The `xml:id` Attribute As a general rule, the `xml:id` global attribute must be unique for the element that bears the attribute. Furthermore, it must begin with a letter or an underscore and contain no characters other that letters, digits, hyphens underscores and full stops. ekdosis issues a warning when it finds that any ⟨*unique id*⟩ of ⟨*unique label*⟩ expected in the first argument of `\DeclareWitness`, `\DeclareHand` or `\DeclareScholar` is not unique or breaks the rules just described, but does not prevent the `.tex` source file from compiling. Instead, it prints the string `<???>` in place of the expected formatted siglum so that the error in the `.tex` source file can be easily spotted and corrected.


As the ⟨*unique id*⟩ declared with `\DeclareShorthand` is not to be exported in the `TEI xml` outputfile, ekdosis checks neither its uniqueness nor its validness.


It must be noted that LaTeX labels that are provided in commands such as `\label`, `\cite` and the like must also be unique in the document. As LaTeX will issue warnings if it finds duplicates, `\ekdosis` does not check their uniqueness but will issue warnings if such labels contain invalid strings.

`\SetTEIxmlExport` **`TEI xml` Export Settings** `\SetTEIxmlExport{`⟨*csv list of options*⟩`}` can be used in the preamble or at any point of the document, except inside environments set to receive an apparatus criticus, namely the `ekdosis` environment or any other similar environment declared by means of `\DeclareApparatus`.[30] At the time of writing, there is only one option, as follows:—

`autopar` `autopar=true|false` `Default: true`

The algorithm described above applies for edition texts composed in running paragraphs or in lines of poetry, but it may fail to produce a valid `TEI xml` output with other arrangements, such as performance texts or transcriptions of speech for which the `TEI` Guidelines define specific rules. `autopar=false` instructs ekdosis to ignore blank lines in the `.tex` source file as markers for paragraph boundaries. As a result, each paragraph of the edition text must be found within an environment associated with the `xml` `<p>` element, such as `ekdpar` or any other environment declared as such by means of `\EnvtoTEI` described below in sect. 10.4 on page 40. A typical use case of `autopar=false` is provided below in sect. 10.5 on page 42.

`ekdpar` `\begin{ekdpar}` ... `\end{ekdpar}` is a simple environment that does nothing but insert `\par` primitives. It can be used to instruct ekdosis to place paragraphs within `<p>` elements when `autopar` has been set to `false` by means of `\SetTEIxmlExport` described above.

10.3 Routine LaTeX Commands and Environments

The list of LaTeX commands known by ekdosis at the time of writing follows. To this list must be added the LaTeX standard commands that are used for sectional divisions as described above in sect. 8.1 on page 32 and most of the commands provided by the

[30] See above sect. 4.3.1 on page 21.

arabluatex and icite[31] packages. Standard citation commands are also supported as will be described below in sect. 10.7 on page 46:—

LaTeX command	TEI xml element
\textsuperscript{}	<hi rend="sup"></hi>
\textsubscript{}	<hi rend="sub"></hi>
\textbf{}	<hi rend="bold"></hi>
\textit{}	<hi rend="italic"></hi>
\textsc{}	<hi rend="smallcaps"></hi>
\textsf{}	<hi rend="sf"></hi>
\footnote{}	<note place="bottom"></note>
\enquote⟨*⟩{}	<quote></quote>
\label{label}	<anchor xml:id="label"/>
\linelabel{label}	<anchor xml:id="label"/>
\ref{label}	<ptr ="#label"/>
\pageref{label}	<ptr ="#label"/>
\vref{label}	<ptr ="#label"/>
\vpageref{label}	<ptr ="#label"/>
\pagebreak⟨*[⟨1-4⟩]⟩	no output
\mbox{}	no output

As for environments:—

LaTeX environment	TEI xml element
flushright	
flushleft	
center	
quotation	<quote></quote>
quoting	<quote></quote>
ekdpar	
ekdverse	<lg></lg>
verse	<lg></lg>

Regarding other, very frequently used commands or environments, some do not need to be inserted in the translation tables: as already said above, ekdosis converts by default the original names of these into xml elements. For instance, \emph{} and \begin{quote} ... \end{quote} will result in <emph></emph> and <quote></quote> respectively.

For the same simple reason, if one wishes to have words within a TEI xml element that does not have any LaTeX equivalent, all is needed is to define an inoperative LaTeX command named after the TEI element, like so:—

```
% Preamble:
\newcommand{\mentioned}[1]{#1}

% Document:

Our usage corresponds to the \mentioned{aggregate} of many
```

[31] Robert Alessi, *The Icite package: Indices locorum citatorum* (version 1.3a) (Mar. 5, 2020), http://ctan.org/pkg/icite.

```
mathematical writings and to the sense of \mentioned{class} found in
older logical writings.
```

TEI xml output:—

```
<p>Our usage corresponds to the <mentioned>aggregate</mentioned> of
many mathematical writings and to the sense of
<mentioned>class</mentioned> found in older logical writings.</p>
```

Of course, it is also possible to have the "mentioned" words printed in a different font family:—

```
\newcommand{\mentioned}[1]{\textsf{#1}}
```

This command will print them in a sans serif font family, with the exact same TEI xml output as above.

10.4 Processing New Commands or Environments

The following three commands are provided to instruct ekdosis how to convert unknown or unusual (LA)TEX commands or environments into TEI xml equivalents.

\TeXtoTEI `\TeXtoTEI{`⟨*csname*⟩`}{`⟨*TEI element*⟩`}[`⟨*TEI attribute(s)*⟩`]`

\TeXtoTEI takes two mandatory arguments and one optional argument, namely: the control sequence name to be converted, the TEI element it is to be converted into and any additional xml attributes to be appended to the opening TEI element. For example, the \sidenote command that is provided by the \sidenotes package can be processed like so:—

```
% Preamble:
\TeXtoTEI{sidenote}{note}[place="margin"]

% Document:
\begin{ekdosis}
  \begin{ekdverse}
    The self-same moment I could pray;\sidenote{The spell begins to
      break}\footnote{The turning point of the poem...}
  \end{ekdverse}
\end{ekdosis}
```

TEI xml output:—

```
<lg>
  <l>The self-same moment I could pray;
  <note place="margin">The spell begins to break</note>
  <note place="bottom">The turning point of the
  poem...</note></l>
</lg>
```

Even more subtly, provided that the code #STC points to some more information identifying the agency concerned:[32]—

[32] At the time of writing, 'scholars' can be declared with \DeclareScholar as described above on page 8. Then the unique ID used in the first argument of this command can point to the list of references inserted by ekdosis in the back matter section of the TEI ouput file. See below sect. 10.6 on page 43 for more information on how to do this.

```
% Preamble:
\usepackage{sidenotes}
\usepackage[teiexport=tidy]{ekdosis}

\TeXtoTEI{sidenote}{note}[place="margin"]

\newcommand{\STCsnote}[1]{\sidenote{#1}}
\TeXtoTEI{STCsnote}{note}[place="margin" resp="#STC"]

% Document:
\begin{ekdosis}
  \begin{ekdverse}
    The self-same moment I could pray;\STCsnote{The spell begins to
      break}\footnote{The turning point of the poem...}
  \end{ekdverse}
\end{ekdosis}
```

TEI xml output:—

```
<lg>
  <l>The self-same moment I could pray;
  <note place="margin" resp="#STC">The spell begins to
  break</note>
  <note place="bottom">The turning point of the
  poem...</note></l>
</lg>
```

\EnvtoTEI
\EnvtoTEI*

\EnvtoTEI⟨*⟩{⟨*env name*⟩}{⟨*TEI element*⟩}[⟨*TEI attribute(s)*⟩]

\EnvtoTEI instructs ekdosis how to convert LaTeX environments into TEI xml equivalents. It takes two mandatory arguments and one optional argument, namely the name of the LaTeX environment to be converted, the TEI element it is to be converted into and any additional attributes to be appended to the TEI opening element. \EnvtoTEI* is restricted to TEI elements that must never appear within <p> elements, such as <p> itself, , <lg> and the like. The following example illustrates how \EnvtoTEI can be used conjointly with babel to convey information about the languages used from LaTeX to TEI:—

```
% Preamble:
% Use babel and babeltags:
\usepackage[greek.ancient, english]{babel}
\babeltags{ancientgreek = greek}

\EnvtoTEI{ancientgreek}{p}[xml:lang="grc"]

% Document:
\begin{ekdosis}
  \begin{ancientgreek}
    περὶ πολλοῦ ἂν ποιησαίμην, ὦ ἄνδρες, τὸ τοιούτους ὑμᾶς ἐμοὶ
    δικαστὰς περὶ τούτου τοῦ πράγματος γενέσθαι, οἵοίπερ ἂν ὑμῖν
    αὐτοῖς εἴητε τοιαῦτα πεπονθότες...
  \end{ancientgreek}
\end{ekdosis}
```

TEI xml output:—

```
<p xml:lang="grc">περὶ πολλοῦ ἂν ποιησαίμην, ὦ ἄνδρες, τὸ
τοιούτους ὑμᾶς ἐμοὶ δικαστὰς περὶ τούτου τοῦ πράγματος
γενέσθαι, οἵοίπερ ἂν ὑμῖν αὐτοῖς εἶητε τοιαῦτα πεπονθότες...</p>
```

\TeXtoTEIPatt

\TeXtoTEIPatt{⟨*TEX pattern*⟩}{⟨*TEI pattern*⟩}

Finally, this more flexible—and more delicate to handle—command uses pattern matching to instruct ekdosis how to convert (LA)TEX commands into TEI equivalents. In the first mandatory argument, strings to be captured are marked in sequence with numbers prefixed by #, like so: #1, #2, #3 and so forth. Then, in the second mandatory argument, the strings captured are inserted where each of them is expected in the TEI element.

Strings must be entered exactly as ekdosis will find them as the .tex source file is compiled. Specifically, *control sequences*, namely the coded commands immediately preceded by '\' are always found followed by a space. For instance, \emph{} will be seen and processed by ekdosis as \emph␣{}.

The following example illustrates how ekdosis can be instructed to process the \textcolor{⟨*color*⟩}{⟨*text*⟩} command:—

```
\TeXtoTEIPatt{\textcolor {#1}{#2}}{<hi rend="#1">#2</hi>}

Sample text with a \textcolor{red}{word} in red.
```

```
<p>Sample text with a
<hi rend="red">word</hi>in red.</p>
```

10.5 Specific TEI Modules

The following example illustrates how ekdosis can be adapted in a straightforward way to modules provided by the TEI for encoding specific texts such as transcriptions of speech.[33] The technique applied below uses \EnvtoTEI conjointly with \SetTEIxmlExport{autopar=false} described above on page 38:—

```
% Preamble:
\newenvironment{speech}{\par}{\par}
\newcommand{\speaker}[1]{\textbf{#1}\par}
\EnvtoTEI{speech}{sp}

\SetTEIxmlExport{autopar=false}

% Document:
\begin{ekdosis}
  \begin{speech}
    \speaker{Σωκράτης}
    \begin{ekdpar}
      κατέβην χθὲς εἰς Πειραιᾶ μετὰ Γλαύκωνος τοῦ Ἀρίστωνος
      προσευξόμενός τε τῇ θεῷ καὶ ἅμα τὴν ἑορτὴν βουλόμενος θεάσασθαι
      τίνα τρόπον ποιήσουσιν ἅτε νῦν πρῶτον ἄγοντες. καλὴ μὲν οὖν μοι
      καὶ ἡ τῶν ἐπιχωρίων πομπὴ ἔδοξεν εἶναι, οὐ μέντοι ἧττον ἐφαίνετο
      πρέπειν ἣν οἱ Θρᾷκες ἔπεμπον.
    \end{ekdpar}
```

[33] See https://tei-c.org/release/doc/tei-p5-doc/en/html/TS.html.

```
19    \end{speech}
20  \end{ekdosis}
```

Rem. 1 Lines 2–3 define a basic environment meant to contain indivivual speeches and a command to hold the name of the speaker. This name is printed in bold face and followed by a new paragraph in the PDF output.

Rem. 2 Line 4 instructs ekdosis to convert `speech` LaTeX environments into `<sp>` `TEI xml` elements.

Rem. 3 Line 6 disables the `autopar` algorithm that `\ekdosis` provides by default for running paragraphs of text. As a consequence, `ekdpar` is used to mark the paragraphs.

PDF output:—

Σωκράτης

κατέβην χθὲς εἰς Πειραιᾶ μετὰ Γλαύκωνος τοῦ Ἀρίστωνος προσευξόμενός τε τῇ θεῷ καὶ ἅμα τὴν ἑορτὴν βουλόμενος θεάσασθαι τίνα τρόπον ποιήσουσιν ἅτε νῦν πρῶτον ἄγοντες. καλὴ μὲν οὖν μοι καὶ ἡ τῶν ἐπιχωρίων πομπὴ ἔδοξεν εἶναι, οὐ μέντοι ἧττον ἐφαίνετο πρέπειν ἢν οἱ Θρᾷκες ἔπεμπον.

`TEI xml` output:—

```
<sp>
  <speaker>Σωκράτης</speaker>
  <p>κατέβην χθὲς εἰς Πειραιᾶ μετὰ Γλαύκωνος τοῦ Ἀρίστωνος
  προσευξόμενός τε τῇ θεῷ καὶ ἅμα τὴν ἑορτὴν βουλόμενος
  θεάσασθαι τίνα τρόπον ποιήσουσιν ἅτε νῦν πρῶτον ἄγοντες.
  καλὴ μὲν οὖν μοι καὶ ἡ τῶν ἐπιχωρίων πομπὴ ἔδοξεν εἶναι, οὐ
  μέντοι ἧττον ἐφαίνετο πρέπειν ἢν οἱ Θρᾷκες ἔπεμπον.</p>
</sp>
```

10.6 References to Cited Works

A full example of what is technically called a *Conspectus Siglorum* can be found above in sect. 2.2.1 on page 9. Such a list of manuscript sigla should be found immediately before the edition text. Traditionally, this section is followed by a list of other sources used to establish the text, so that the edited text is in the end established both from manuscript evidence (the "witnesses") and other works based on a scholarly approach of the text (the "sources") which are called in Latin *Editiones uel Studia*. As a consequence of this classification as "witness" or "source", the former must go within the `<listWit>` element of the `TEI` header, whereas the latter is to be found within the `<listBibl>` element.

`\SetxmlBibResource`

`\SetxmlBibResource{`⟨*basename*⟩`}` is a preamble-only command. If a base name for a `TEI xml` compliant bibliographical database be provided, ekdosis will use it and insert formatted data in the back matter section of its own `TEI xml` output file, as `<biblStruct>` elements within a `listBibl` section.

As an example, the following Bib(La)TeX entry and its `TEI` equivalent follow:[34] —

```
@Book{Drak,
  title = {Punicorum Libri Septemdecim},
  author = {Silius Italicus, Tiberius Catius},
  editor = {Drakenborch, Arnold},
  date = {1717},
  publisher = {Trajecti ad Rhenum},
  location = {Utrecht}
}
```

[34] To the author's knowledge, Zotero (`https://www.zotero.org`) provides excellent `TEI xml` output from Bib(La)TeX input files.

```
<?xml version="1.0" encoding="UTF-8"?>
<listBibl xmlns="http://www.tei-c.org/ns/1.0">
  <biblStruct type="book" xml:id="Drak">
    <monogr>
      <title level="m">Punicorum libri septemdecim</title>
      <author>
        <forename>Tiberius Catius</forename>
        <surname>Silius Italicus</surname>
      </author>
      <editor>
        <forename>Arnold</forename>
        <surname>Drakenborch</surname>
      </editor>
      <imprint>
        <pubPlace>Utrecht</pubPlace>
        <publisher>Trajecti ad Rhenum</publisher>
        <date>1717</date>
      </imprint>
    </monogr>
  </biblStruct>
</listBibl>
```

As can be seen, the same string `Drak` is used as a label in the Bib(LaTeX) file (l. 1) and an `xml:id` in the `TEI` file (l. 3). This same label must be used again in the preamble of the `.tex` source file to declare Arnold Drakenborch as a scholar,[35] like so:—

```
% Use 'bibl.xml' as a TEI xml bibliographical database:
\SetxmlBibResource{bibl} % 'bibl' is the basename of 'bibl.xml'

% Declare A. Drakenborch as scholar:
\DeclareScholar{Drak}{\emph{Drakenborch}}
```

Finally, an extract of Silius Italicus' *Punica*, Book 9, ll. 30-2 follows (`.tex` source file, PDF output and `TEI` output files):—

```
% Preamble:
\usepackage[teiexport=tidy]{ekdosis}

% Witnesses:
\DeclareWitness{L}{L}{Laurentianus, plut, XXXVII, cod. 16}[
                      origDate=s. XV]
% Other witnesses [...]

% Scholars:
\DeclareScholar{Drak}{\emph{Drakenborch}}
% Other scholars [...]

% basename of the .xml bibliographical database:
\SetxmlBibResource{bibl}

% Document:
\begin{ekdosis}
  \begin{ekdverse}
```

[35] See above on page 8.

```
    Sed uos, quorum oculos atque ora humentia uidi,\\
    uertere cum consul terga et remeare iuberet,\\
    \app{
      \lem[wit=Drak]{ne morem}
      \rdg[wit={L, F}]{me morem}
      \rdg[wit={O, V}]{memorem}
    } et pugnae signum exspectate petendae:
  \end{ekdverse}
\end{ekdosis}
```

PDF output:—

Sed uos, quorum oculos atque ora humentia uidi, 30
uertere cum consul terga et remeare iuberet, 31
ne morem et pugnae signum exspectate petendae: 32

32 ne morem *Drakenborch*] me morem L F memorem O V.

`TEI xml` output file produced by ekdosis (narrowed down to the `<text>` element):—

```
<text>
  <body>
    <lg>
      <l>Sed uos, quorum oculos atque ora humentia uidi,</l>
      <l>uertere cum consul terga et remeare iuberet,</l>
      <l>
      <app>
        <lem wit="#Drak">ne morem</lem>
        <rdg wit="#L #F">me morem</rdg>
        <rdg wit="#O #V">memorem</rdg>
      </app>et pugnae signum exspectate petendae:</l>
    </lg>
  </body>
  <back>
    <listBibl>
      <biblStruct type="book" xml:id="Drak">
        <monogr>
          <title level="m">Punicorum libri septemdecim</title>
          <author>
            <forename>Tiberius Catius</forename>
            <surname>Silius Italicus</surname>
          </author>
          <editor>
            <forename>Arnold</forename>
            <surname>Drakenborch</surname>
          </editor>
          <imprint>
            <pubPlace>Utrecht</pubPlace>
            <publisher>Trajecti ad Rhenum</publisher>
            <date>1717</date>
          </imprint>
        </monogr>
      </biblStruct>
```

```
    </listBibl>
  </back>
</text>
```

10.7 Citation Commands

ekdosis can also convert into TEI xml references to cited works. Depending on the optional arguments used in the citation command, references will be converted into <ptr> or <ref> elements with the appropriate ID supplied by means of the target attribute.

Of course, for this mechanism to work, BibTEX or BibLATEX must be used and connected to some .bib bibliographical database file. Additionally, this .bib file must have been converted into a TEI xml compliant file where all the Bib(LA)TEX entries that are used in the document are found within <biblStruct> elements.[36] Finally, this .xml bibliographical database must have been connected to the .tex source file by means of \SetxmlBibResource described above in sect. 10.6 on page 43.

As an example, the following sample.bib file is used:—

```
@Book{ReynoldsWilson1991,
  author =         {Reynolds, L. D. and Wilson, N. G},
  title =         {Scribes and Scholars},
  year =         {1991},
  subtitle =         {A Guide to the Translation of Greek and Latin
                 Literature},
  edition =         {3},
  publisher =         {Clarendon Press},
  location =         {Oxford}
}
```

It has been converted into sample.xml as follows:—

```
<?xml version="1.0" encoding="UTF-8"?>
<listBibl xmlns="http://www.tei-c.org/ns/1.0">
  <biblStruct type="book" xml:id="ReynoldsWilson1991">
    <monogr>
      <title level="m">Scribes and Scholars</title>
      <author>
        <forename>L. D.</forename>
        <surname>Reynolds</surname>
      </author>
      <author>
        <forename>N. G.</forename>
        <surname>Wilson</surname>
      </author>
      <edition>3</edition>
      <imprint>
        <pubPlace>Oxford</pubPlace>
        <publisher>Clarendon Press</publisher>
        <date>1991</date>
      </imprint>
    </monogr>
  </biblStruct>
</listBibl>
```

[36] See above n. 34 on page 43 for information on how to do this.

Once both files have been prepared, inserting references and exporting them into the TEI xml ouput file can be achieved in a straightforward way. (The full sample.tex is provided below.)—

```
\documentclass{article}

\usepackage[teiexport=tidy]{ekdosis}
\SetxmlBibResource{sample} % base name supplied here, without the
                           % extension

\usepackage[style=oxnotes]{biblatex}
\addbibresource{sample.bib}

\begin{document}
\begin{ekdosis}
  On textual criticism, see \cite[207--241]{ReynoldsWilson1991}.
\end{ekdosis}
\end{document}
```

PDF output:—

On textual criticism, see L. D. Reynolds and N. G Wilson, *Scribes and Scholars: A Guide to the Translation of Greek and Latin Literature* (3rd edn., Oxford: Clarendon Press, 1991), 207–41.

TEI xml ouput narrowed down to the contents of the <text> element:—

```
<text>
  <body>
    <p>On textual criticism, see
    <ref target="#ReynoldsWilson1991">207--241</ref>.</p>
  </body>
  <back>
    <listBibl>
      <biblStruct type="book" xml:id="ReynoldsWilson1991">
        <monogr>
          <title level="m">Scribes and Scholars</title>
          <author>
            <forename>L. D.</forename>
            <surname>Reynolds</surname>
          </author>
          <author>
            <forename>N. G.</forename>
            <surname>Wilson</surname>
          </author>
          <edition>3</edition>
          <imprint>
            <pubPlace>Oxford</pubPlace>
            <publisher>Clarendon Press</publisher>
            <date>1991</date>
          </imprint>
        </monogr>
      </biblStruct>
    </listBibl>
  </back>
</text>
```

At the time of writing, the following citation commands are converted into TEI xml by ekdosis:—

(a) \icite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}[37]
(b) \cite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(c) \Cite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(d) \cite*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(e) \parencite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(f) \Parencite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(g) \parencite*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(h) \footcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(i) \footcitetext[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(j) \textcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(k) \Textcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(l) \smartcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(m) \Smartcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(n) \autocite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(o) \Autocite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(p) \autocite*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
(q) \Autocite*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}

The next release of ekdosis will include all citation commands with the exception of so-called “qualified citation lists”.

11 Future Work

A short, uncommented list of what is planned in the versions of ekdosis to come follows:—

(a) Very short-term (weeks):—
  (a) Editorial changes, for inserting corrections and conjectures.
  (b) Text structure: milestone elements.
(b) Short-term (months):—
  (a) Poetry: The standard verse environment is supported by the current version of ekdosis, in addition to ekdverse an example of which has been provided above on page 44. ekdverse will provide refined options, such as metrical analysis, stanzaic forms, *&c.* Arabic poetry through the environments and commands provided by the arabluatex package will also be supported.
  (b) Correspondence and alignment, segmentation: The functions are being tested at the time of writing and will be included shortly in ekdosis.
(c) Medium-term: Indexing, commands and environments for specific modules of the TEI.

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Version 1.3, 3 November 2008

[37] From the icite package. \icite can be used in place of almost any standard citation command. See Alessi, *The Icite package*, see n. 31.

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13 References

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Van den Branden, Ron, Terras, Melissa, and Vanhoutte, Edward, "TEI by Example," http://www.teibyexample.org, accessed Aug. 4, 2020.

14 Sample: C. J. Caesar, *Gallic War*, VI, XIII.1

14.1 `.tex` Source File

```
\documentclass[12pt]{article}
\usepackage{fontspec}
\usepackage[latin.classic,french,english]{babel}
\babelfont{rm}{Old Standard}
\babelfont{sf}{NewComputerModern Sans}
\babelfont{tt}{NewComputerModern Mono}

\usepackage{nextpage}
\usepackage{xltabular}

\usepackage[teiexport=tidy]{ekdosis}
\DeclareApparatus{default}[
        delim=\hskip0.75em,
        ehook=.]

\FormatDiv{2}{}{.}

\SetAlignment{
  tcols=3,
  lcols=1,
  texts=latin[xml:lang="la"];
        english[xml:lang="en"];
        french[xml:lang="fr"],
  apparatus=latin,
  segmentation=auto}

\AtBeginEnvironment{latin}{\selectlanguage{latin}}
\AtBeginEnvironment{english}{\sloppy\selectlanguage{english}}
\AtBeginEnvironment{french}{\sloppy\selectlanguage{french}}

\DeclareWitness{A}{A}{\emph{Bongarsianus} 81}[
               msName=Bongarsianus,
               settlement=Amsterdam,
               idno=81,
               institution=University Library,
               origDate=s. IX--X]
\DeclareHand{A1}{A}{A\textsuperscript{1}}[\emph{Emendationes
```

```
                scribae ipsius}]
\DeclareWitness{M}{M}{\emph{Parisinus Lat.} 5056}[
                origDate={s. XII}]
\DeclareWitness{B}{B}{\emph{Parisinus Lat.} 5763}[
                origDate={s. IX--X}]
\DeclareWitness{R}{R}{\emph{Vaticanus Lat.} 3864}[
                origDate={s. X}]
\DeclareWitness{S}{S}{\emph{Laurentianus} R 33}[
                origDate={s. X}]
\DeclareWitness{L}{L}{\emph{Londinensis} Br. Mus. 10084}[
                origDate={s. XI}]
\DeclareWitness{N}{N}{\emph{Neapolitanus} IV, c. 11}[
                origDate={s. XII}]
\DeclareWitness{T}{T}{\emph{Parisinus Lat.} 5764}[
                origDate={s. XI}]
\DeclareWitness{f}{\emph{f}}{\emph{Vindobonensis} 95}[
                origDate={s. XII}]
\DeclareWitness{U}{U}{\emph{Vaticanus Lat.} 3324}[
                origDate={s. XI}]
\DeclareWitness{l}{\emph{l}}{\emph{Laurentianus} Riccard. 541}[
                origDate={s. XI--XII}]
\DeclareShorthand{a}{α}{A,M,B,R,S,L,N}
\DeclareShorthand{b}{β}{T,f,U,l}

\begin{document}

\begin{xltabular}[c]{0.75\linewidth}{lXl}
  \caption*{\textbf{Conspectus siglorum}\label{tab:conspectus-siglorum}}\\
  \multicolumn{3}{c}{\emph{Familia} \getsiglum{a}}\\
  \SigLine{A}\\
  & \getsiglum{A1} \emph{Emendationes scribae ipsius} & \\
  \SigLine{M}\\
  \SigLine{B}\\
  \SigLine{R}\\
  \SigLine{S}\\
  \SigLine{L}\\
  \SigLine{N}\\
  \multicolumn{3}{c}{\emph{Familia} \getsiglum{b}}\\
  \SigLine{T}\\
  \SigLine{f}\\
  \SigLine{U}\\
  \SigLine{l}\\
\end{xltabular}

\cleartoevenpage

\begin{alignment}
  \begin{latin}
    \ekddiv{head=XIII, depth=2, n=6.13, type=section}
    In omni Gallia eorum hominum qui \app{
      \lem[wit=a]{aliquo}
      \rdg[wit=b, alt=in al-]{in aliquo}}
    sunt numero atque honore genera sunt duo. Nam plebes paene
    seruorum habetur loco, quae \app{
      \lem[wit={A,M}, alt={nihil audet (aut et \getsiglum{A1})
```

```
        per se}]{nihil audet per se}
      \rdg[wit=A1,nordg]{nihil aut et per se}
      \rdg[wit={R,S,L,N}]{nihil habet per se}
      \rdg[wit=b]{per se nihil audet}}, \app{
      \lem[wit=a]{nullo}
      \rdg[wit=b]{nulli}} adhibetur \app{
      \lem{consilio}
      \rdg[wit={T, U}, alt=conc-]{concilio}}.
  \end{latin}
  \begin{english}
    \ekddiv{head=XIII, depth=2, n=6.13, type=section}
    Throughout all Gaul there are two orders of those men who are of
    any rank and dignity: for the commonality is held almost in the
    condition of slaves, and dares to undertake nothing of itself,
    and is admitted to no deliberation.
  \end{english}
  \begin{french}
    \ekddiv{head=XIII, depth=2, n=6.13, type=section}
    Partout en Gaule il y a deux classes d'hommes qui comptent et qui
    sont considérés. Quant aux gens du peuple, ils ne sont guère
    traités autrement que des esclaves, ne pouvant se permettre aucune
    initiative, n'étant consultés sur rien.
  \end{french}
\end{alignment}

\end{document}
```

14.2 `TEI xml` Output

```
<?xml version="1.0" encoding="utf-8"?>
<TEI xmlns="http://www.tei-c.org/ns/1.0">
  <teiHeader>
    <fileDesc>
      <titleStmt>
        <title>
          <!-- Title -->
        </title>
        <respStmt>
          <resp>
            <!-- Edited by -->
          </resp>
          <name>
            <!-- Name -->
          </name>
        </respStmt>
      </titleStmt>
      <publicationStmt>
        <distributor>
          <!-- Distributor name  -->
        </distributor>
      </publicationStmt>
      <sourceDesc>
```

```
24          <listWit>
25            <witness xml:id="A">
26            <abbr type="siglum">A</abbr>
27            <emph>Bongarsianus</emph>81
28            <msDesc>
29              <msIdentifier>
30                <settlement>Amsterdam</settlement>
31                <institution>University Library</institution>
32                <idno>81</idno>
33                <msName>Bongarsianus</msName>
34              </msIdentifier>
35              <physDesc>
36                <handDesc hands="1">
37                  <handNote xml:id="A1">
38                    <abbr type="siglum">A
39                    <hi rend="sup">1</hi></abbr>
40                    <p>
41                      <emph>Emendationes scribae ipsius</emph>
42                    </p>
43                  </handNote>
44                </handDesc>
45              </physDesc>
46              <history>
47                <origin>
48                  <origDate>s. IX--X</origDate>
49                </origin>
50              </history>
51            </msDesc></witness>
52            <witness xml:id="M">
53            <abbr type="siglum">M</abbr>
54            <emph>Parisinus Lat.</emph>5056
55            <msDesc>
56              <msIdentifier />
57              <history>
58                <origin>
59                  <origDate>s. XII</origDate>
60                </origin>
61              </history>
62            </msDesc></witness>
63            <witness xml:id="B">
64            <abbr type="siglum">B</abbr>
65            <emph>Parisinus Lat.</emph>5763
66            <msDesc>
67              <msIdentifier />
68              <history>
69                <origin>
70                  <origDate>s. IX--X</origDate>
71                </origin>
72              </history>
73            </msDesc></witness>
74            <witness xml:id="R">
75            <abbr type="siglum">R</abbr>
76            <emph>Vaticanus Lat.</emph>3864
77            <msDesc>
78              <msIdentifier />
```

```
            <history>
              <origin>
                <origDate>s. X</origDate>
              </origin>
            </history>
          </msDesc></witness>
          <witness xml:id="S">
          <abbr type="siglum">S</abbr>
          <emph>Laurentianus</emph>R 33
          <msDesc>
            <msIdentifier />
            <history>
              <origin>
                <origDate>s. X</origDate>
              </origin>
            </history>
          </msDesc></witness>
          <witness xml:id="L">
          <abbr type="siglum">L</abbr>
          <emph>Londinensis</emph>Br. Mus. 10084
          <msDesc>
            <msIdentifier />
            <history>
              <origin>
                <origDate>s. XI</origDate>
              </origin>
            </history>
          </msDesc></witness>
          <witness xml:id="N">
          <abbr type="siglum">N</abbr>
          <emph>Neapolitanus</emph>IV, c. 11
          <msDesc>
            <msIdentifier />
            <history>
              <origin>
                <origDate>s. XII</origDate>
              </origin>
            </history>
          </msDesc></witness>
          <witness xml:id="T">
          <abbr type="siglum">T</abbr>
          <emph>Parisinus Lat.</emph>5764
          <msDesc>
            <msIdentifier />
            <history>
              <origin>
                <origDate>s. XI</origDate>
              </origin>
            </history>
          </msDesc></witness>
          <witness xml:id="f">
          <abbr type="siglum">
            <emph>f</emph>
          </abbr>
          <emph>Vindobonensis</emph>95
```

```
          <msDesc>
            <msIdentifier />
            <history>
              <origin>
                <origDate>s. XII</origDate>
              </origin>
            </history>
          </msDesc></witness>
          <witness xml:id="U">
          <abbr type="siglum">U</abbr>
          <emph>Vaticanus Lat.</emph>3324
          <msDesc>
            <msIdentifier />
            <history>
              <origin>
                <origDate>s. XI</origDate>
              </origin>
            </history>
          </msDesc></witness>
          <witness xml:id="l">
          <abbr type="siglum">
            <emph>l</emph>
          </abbr>
          <emph>Laurentianus</emph>Riccard. 541
          <msDesc>
            <msIdentifier />
            <history>
              <origin>
                <origDate>s. XI--XII</origDate>
              </origin>
            </history>
          </msDesc></witness>
        </listWit>
      </sourceDesc>
    </fileDesc>
    <encodingDesc>
      <variantEncoding method="parallel-segmentation"
      location="internal" />
    </encodingDesc>
  </teiHeader>
  <text>
    <body>
      <div xml:id="div-latin_1" xml:lang="la">
        <div type="section" n="6.13">
          <head>XIII</head>
          <p>In omni Gallia eorum hominum qui
          <app>
            <lem wit="#A #M #B #R #S #L #N">aliquo</lem>
            <rdg wit="#T #f #U #l">in aliquo</rdg>
          </app>sunt numero atque honore genera sunt duo. Nam
          plebes paene seruorum habetur loco, quae
          <app>
            <lem wit="#A #M">nihil audet per se</lem>
            <rdg wit="#A1">nihil aut et per se</rdg>
            <rdg wit="#R #S #L #N">nihil habet per se</rdg>
```

```
            <rdg wit="#T #f #U #l">per se nihil audet</rdg>
          </app>,
          <app>
            <lem wit="#A #M #B #R #S #L #N">nullo</lem>
            <rdg wit="#T #f #U #l">nulli</rdg>
          </app>adhibetur
          <app>
            <lem>consilio</lem>
            <rdg wit="#T #U">concilio</rdg>
          </app>.</p>
        </div>
      </div>
      <div xml:id="div-english_1" xml:lang="en">
        <div type="section" n="6.13">
          <head>XIII</head>
          <p>Throughout all Gaul there are two orders of those men
          who are of any rank and dignity: for the commonality is
          held almost in the condition of slaves, and dares to
          undertake nothing of itself, and is admitted to no
          deliberation.</p>
        </div>
      </div>
      <div xml:id="div-french_1" xml:lang="fr">
        <div type="section" n="6.13">
          <head>XIII</head>
          <p>Partout en Gaule il y a deux classes d'hommes qui
          comptent et qui sont considérés. Quant aux gens du
          peuple, ils ne sont guère traités autrement que des
          esclaves, ne pouvant se permettre aucune initiative,
          n'étant consultés sur rien.</p>
        </div>
      </div>
    </body>
  </text>
</TEI>
```

15 Arabic Sample File

arabic-sample.tex:—

```
% Instructions:
% 1. Compile this file three times.
%    - Open arabic-sample.pdf and arabic-sample-tei.xml and see the
%      result.
% 2. Compile arabic-sample_out.tex three times.
%    - Open arabic-sample_out.pdf and arabic-sample-out-tei.xml and
%      see the result.
%
\documentclass{article}

% The following three lines are only needed by the
% 'arabic-sample_out.tex' that arabluatex is instructed to produce:
```

```
\usepackage{babel}
\babelprovide[onchar=fonts]{arabic}
\babelfont[*arabic]{rm}{Amiri}

% instruct ekdosis to output TEI xml (arabic-sample-tei.xml):
\usepackage[teiexport=tidy]{ekdosis}

% instruct arabluatex to ouput sample-arabic_out.tex with Unicode
% Arabic strings in place of arabtex ASCII scheme:
\usepackage[fullvoc,export]{arabluatex}

\begin{document}

\begin{arabexport} % export arabtex strings to Unicode Arabic
  \begin{ekdosis}
    \begin{arab}
      'inna 'abI kAna mina
      \app{
        \lem{'l-muqAtilaTi}
        \rdg{'l-muqAtilIna}
      }
      wa-kAnat 'ummI min `u.zamA'i buyUti 'l-zamAzimaTi.
    \end{arab}
  \end{ekdosis}
\end{arabexport}
\end{document}
```

16 Implementation

ekdosis relies on Lua functions and tables. Read the `.lua` files that accompany ekdosis for more information.

```
\RequirePackage{iftex}
```

Of course, ekdosis requires LuaLaTeX. Issue an error if the document is processed with another engine.

```
\RequireLuaTeX
```

Set global options:—

```
\RequirePackage{expkv-opt}
\RequirePackage{expkv-def}
\newif\if@pkg@float
\newif\if@pkg@footins
\newif\if@pkg@ekddivs
\newif\if@parnotesroman
\newif\if@pkg@parnotes
\newif\if@ftei@export
\ekvdefinekeys{ekdosis}{
  choice layout = {float = {\@pkg@floattrue},
    footins = {\@pkg@floatfalse\@pkg@footinstrue}},
  initial layout = float,
  unknown-choice layout = \PackageError{ekdosis}{unknown
    layout=#1}{`layout' must be either `float' or `footins'.},
  choice divs = {ekdosis = {\@pkg@ekddivstrue},
    latex = {\@pkg@ekddivsfalse
```

```
      \AtBeginDocument{\luadirect{ekdosis.setekddivsfalse()}}},
  initial divs = ekdosis,
  unknown-choice divs = \PackageError{ekdosis}{unknown divs=#1}{`divs'
    must be either `ekdosis' or `latex'.},
  choice parnotes = {false = {},
    true = {\@pkg@parnotestrue},
    roman = {\@pkg@parnotestrue\@parnotesromantrue}},
  default parnotes = true,
  unknown-choice parnotes = \PackageError{ekdosis}{unknown
    parnotes=#1}{`parnotes' must be either `true', or `false' or
    `roman'.},
  choice teiexport = {false = {},
    true = {\tei@exporttrue
      \AtBeginDocument{\luadirect{ekdosis.openteistream()}}%
      \AtEndDocument{\luadirect{ekdosis.closeteistream()}}},
    tidy = {\tei@exporttrue
      \AtBeginDocument{\luadirect{ekdosis.openteistream()}}%
      \AtEndDocument{\luadirect{ekdosis.closeteistream("tidy")}}}},
  default teiexport = true,
  unknown-choice teiexport = \PackageError{ekdosis}{unknown
    teiexport=#1}{`teiexport' must be either `true', `false' or
    `tidy'.}
}
\ekvoProcessLocalOptions{ekdosis}
```

Required Packages In addition to iftex, expkv-opt and expkv-def, a list of the packages that are required by ekdosis follows:—

```
% \RequirePackage{iftex} % already loaded above
% \RequirePackage{expkv-opt} % already loaded above
% \RequirePackage{expkv-def} % already loaded above
\RequirePackage{luacode}
\RequirePackage{paracol}
\RequirePackage{xparse}
\RequirePackage{etoolbox}
\RequirePackage{lineno}
\RequirePackage{keyfloat}
\RequirePackage{refcount}
\RequirePackage{zref-user}
\RequirePackage{zref-abspage}
\RequirePackage{ltxcmds}
\RequirePackage{atbegshi}
\RequirePackage{ifoddpage}
\if@pkg@parnotes
  \RequirePackage{parnotes}
\fi
```

Lua Here begins the real work: load `ekdosis.lua`:—

```
\luadirect{dofile(kpse.find_file("ekdosis.lua"))}
\AtEndDocument{
  \luadirect{ekdosis.closestream()}
}
```

\SetHooks `\SetHooks` is used to set hooks meant to be shared by all declared apparatuses, such as the font size, the format of numerals, *&c.* This command can be used in the preamble or at any point of the document.

```
\ekvdefinekeys{ekd@hooks}{
  store appfontsize = \ekd@appfontsize,
  store refnumstyle = \ekd@refnumstyle,
  store postrefnum = \ekd@postrefnum,
  initial appfontsize = \footnotesize,
  initial refnumstyle = \bfseries,
  initial postrefnum = ~
}
\NewDocumentCommand{\SetHooks}{m}{\ekvset{ekd@hooks}{#1}}
```

Build and process the list of witnesses and hands:—

```
\ekvdefinekeys{ekd@witness}{
  store settlement = \settlement@value,
  store institution = \institution@value,
  store repository = \repository@value,
  store collection = \collection@value,
  store idno = \idno@value,
  store msName = \msName@value,
  store origDate = \origDate@value
}
```

\DeclareWitness `\DeclareWitness` is a preamble-only command. It takes three mandatory arguments and one optional argument. It is meant to collect data related to witnesses to be used in the edition text. Data are stored in `Lua` tables and are used to encode the `<listWit>` part of the `TEI` header as well as the Conspectus Siglorum in the edition in print.

```
\NewDocumentCommand{\DeclareWitness}{m m m O{}}{%
  \bgroup
  \ekvset{ekd@witness}{#4}
    \luadirect{ekdosis.newwitness(
      \luastringN{#1},
      \luastringN{#2},
      \luastringN{#3},
      \luastringO{\settlement@value},
      \luastringO{\institution@value},
      \luastringO{\repository@value},
      \luastringO{\collection@value},
      \luastringO{\idno@value},
      \luastringO{\msName@value},
      \luastringO{\origDate@value})}
    \egroup
  }
\@onlypreamble\DeclareWitness
```

\DeclareHand As `\DeclareWitness`, `\DeclareHand` is a preamble-only command meant to collect data and store them in `Lua` tables. It takes three mandatory arguments and one optional argument. The second argument is used to connect the hand to a declared witness it is related to. Then the table in which this witness is recorded can be fed with new data.

```
\NewDocumentCommand{\DeclareHand}{m m m +O{}}{
  \luadirect{ekdosis.newhand(\luastringN{#1},
    \luastringN{#2},
    \luastringN{#3},
```

```
    \luastringN{#4})}
}
\@onlypreamble\DeclareHand
```

\DeclareScholar There is also a table in which are collected data related to scholars' names to be used in the apparatus criticus. \DeclareScholar is a preamble-only command and takes two mandatory arguments: a unique id and a shorthand to be used in the apparatus criticus which can be extracted from a bibliographic database.

```
\NewDocumentCommand{\DeclareScholar}{m m}{
  \luadirect{ekdosis.newscholar(\luastringN{#1},
    \luastringN{#2})}
}
\@onlypreamble\DeclareScholar
```

\DeclareShorthand \DeclareShorthand is a preamble-only command that can be used to record manuscript families or any kind of shorthand to be used to refer to previously declared ids, for example the shorthand codd can be used to point to all declared witnesses. This command takes three mandatory arguments: a unique id, its rendition in print and a csv-list of previously declared ids.

```
\NewDocumentCommand{\DeclareShorthand}{m m m}{
  \luadirect{ekdosis.newshorthand(\luastringN{#1},
    \luastringN{#2},
    \luastringN{#3})}
}
\@onlypreamble\DeclareShorthand
```

\getsiglum \getsiglum{⟨*csv list*⟩} takes a comma-separated list of declared ids by means of \DeclareWitness, \DeclareHand, \DeclareShorthand or \DeclareScholar and returns their respective renditions.

```
\NewDocumentCommand{\getsiglum}{m}{%
  \luadirect{tex.sprint(ekdosis.getsiglum(\luastringN{#1}))}%
}
```

\SigLine \Sigline{⟨*unique id*⟩} takes the unique id of any declared witness by means of \DeclareWitness as argument and returns a line ready to be inserted in a table set to print a Conspectus Siglorum. \SigLine returns three fields separated by the symbol & that is used in tables as follows: the siglum referring to the witness, the contents of the description field and the contents of the optional origDate field.

```
\NewDocumentCommand{\SigLine}{m}{%
  \luadirect{tex.sprint(ekdosis.basic_cs(\luastringN{#1}))}
}
```

TEX to TEI xml Here follow the key-value options to be used by \SetTEIxmlExport below:—

```
\ekvdefinekeys{tei@settings}{
  choice autopar = {true = \luadirect{ekdosis.setteiautopar("yes")},
    false = {\luadirect{ekdosis.setteiautopar("no")}}},
  initial autopar = true,
  unknown-choice autopar = \PackageError{ekdosis}{unknown
    autopar=#1}{`autopar' must be either `true' or `false'.}
}
```

\SetTEIxmlExport `\SetTEIxmlExport` collects the settings to be applied to `TEI xml` export. For now, there is only one option. This command can be used at any point of the document, except inside environments meant to receive an apparatus criticus.

```
\NewDocumentCommand{\SetTEIxmlExport}{m}{
  \unless\ifekd@state\ekvset{tei@settings}{#1}\fi
}
```

The following three commands can be used to instruct ekdosis how to convert unknown or unusual (LA)TEX commands into `TEI xml` equivalents.

\TeXtoTEI `\TeXtoTEI{`⟨*csname*⟩`}{`⟨*TEI element*⟩`}[`⟨*TEI attribute(s)*⟩`]` takes two mandatory arguments and one optional argument, namely: the control sequence name to be converted, the `TEI` element it is to be converted into and any additional `xml` attributes to be appended to the opening `TEI` element:—

```
\NewDocumentCommand{\TeXtoTEI}{m m O{}}{%
  \luadirect{ekdosis.newcmdtotag(\luastringN{#1},
    \luastringN{#2},
    \luastringN{#3})}
}
```

\EnvtoTEI `\EnvtoTEI`⟨***⟩`{`⟨*env name*⟩`}{`⟨*TEI element*⟩`}[`⟨*TEI attribute(s)*⟩`]` instructs how to convert
\EnvtoTEI* LATEX environments into `TEI xml` equivalents. It takes two mandatory arguments and one optional argument, namely the name of the LATEX environment to be converted, the `TEI` element it is to be converted into and any additional attributes to be appended to the `TEI` opening element. `\EnvtoTEI*` is restricted to `TEI` elements that must never appear within `<p>` elements, such as `<div>`, `<lg>` and the like.

```
\NewDocumentCommand{\EnvtoTEI}{s m m O{}}{%
  \IfBooleanTF{#1}{%
  \luadirect{ekdosis.newenvtotag(\luastringN{#2},
    \luastringN{#3},
    \luastringN{#4},
    "yes")}
  }{%
  \luadirect{ekdosis.newenvtotag(\luastringN{#2},
    \luastringN{#3},
    \luastringN{#4})}
  }
}
```

\TeXtoTEIPatt Finally, the more flexible—and more delicate to handle—`\TeXtoTEIPatt{`⟨*TEX pattern*⟩`}{`⟨*TEI pattern*⟩`}` uses pattern matching to instruct ekdosis how to convert (LA)TEX commands into `TEI` equivalents.

```
\NewDocumentCommand{\TeXtoTEIPatt}{m m}{%
  \luadirect{ekdosis.newpatttotag(\luastringN{#1}, \luastringN{#2})}
}
```

\SetTEIFilename `\SetTEIFilename{`⟨*basename*⟩`}` is a preamble-only command. It is used to set the base name of the `TEI xml` output file, to which the suffix `.xml` is appended. By default, the base name is `\jobname-tei`:—

```
\NewDocumentCommand{\SetTEIFileName}{m}{
  \luadirect{ekdosis.setteifilename(\luastringN{#1})}
}
\@onlypreamble\SetTEIFileName
```

`\SetxmlBibResource` This is a preamble-only command. If a base name for a `TEI xml` compliant bibliographical database file is provided with `\SetxmlBibResource{`⟨*basename*⟩`}`, ekdosis will use it and insert formatted data in the back matter section of its own `TEI xml` output file, as `<biblStruct>` elements within a `<listBibl>` section.

```
\NewDocumentCommand{\SetxmlBibResource}{m}{
  \luadirect{ekdosis.setxmlbibresource(\luastringN{#1})}
}
\@onlypreamble\SetxmlBibResource
```

Multi-layer apparatuses ekdosis must know if an entry is to be processed in a single- or multiple-layer context:—

```
\newif\ifekd@mapps
```

Now the key-value options can be defined:—

```
\ekvdefinekeys{ekd@newapp}{
  choice direction = {LR = \def\direction@val{LR},
                      RL = \def\direction@val{RL}},
  unknown-choice direction = \PackageError{ekdosis}{unknown
    direction=#1}{`direction' must be either `LR' or `RL'.},
  store rule = \rule@val,
  nmeta norule = {rule=none},
  code delim = \def\delim@val{\unexpanded{#1}},
  store sep = \sep@val,
  store bhook = \bhook@val,
  store ehook = \ehook@val,
  store maxentries = \limit@val,
  initial direction = LR,
  initial delim = {},
  initial ehook = {\csname ekd@end@apparatus\endcsname}
}
```

`\DeclareApparatus` `\DeclareApparatus{`⟨*apparatus name*⟩`}[`⟨*options*⟩`]` is a preamble-only command. As a mandatory argument, it takes the name of the new layer of notes to be inserted in the apparatus block. Then, the following seven key-value options can be used to lay out the layer: `direction=LR|RL`, `rule`, `delim` (the delimiter between entries), `sep` (the separator between lemma part and readings or notes), `bhook` (LaTeX code inserted as the layer begins), `ehook` (LaTeX code inserted as the layer ends), `maxentries` (if set and `maxentries >= 10`, the number of entries at which a `\pagebreak` is issued):—

```
\NewDocumentCommand{\DeclareApparatus}{m O{}}{
  \newbool{subsq@unit@#1}
  \booltrue{subsq@unit@#1}
  \unless\ifekd@mapps\global\ekd@mappstrue\fi
  \bgroup
  \ekvset{ekd@newapp}{#2}
  \luadirect{ekdosis.newapparatus(
    \luastringN{#1},
    \luastring{\direction@val},
    \luastringO{\rule@val},
    \luastringO{\delim@val},
    \luastringO{\sep@val},
    \luastringO{\bhook@val},
    \luastringO{\ehook@val},
    \luastringO{\limit@val}
    )}
```

```
  \egroup
}
\@onlypreamble\DeclareApparatus
```

Apparatus-related settings and functions. Some booleans to check if an apparatus should be inserted and what is the current environment.

```
\newbool{do@app}
\newif\ifekd@state
\newif\ifekd@isinapp
\newif\ifekd@isinlem
```

The next boolean is shared with arabluatex. `\LRnum` is used internally to ensure that numerals referring to line spans are displayed in the right order.

```
\providebool{al@rlmode}
\@ifpackageloaded{arabluatex}{}{%
  \def\setRL{\booltrue{al@rlmode}\pardir TRT\textdir TRT}
  \def\setLR{\boolfalse{al@rlmode}\pardir TLT \textdir TLT}
}
\protected\def\LRnum#1{\bgroup\textdir TLT#1\egroup}
```

Set counter referring to line numbers and make it global.

```
\newcounter{ekd@lab}
\globalcounter{ekd@lab}
```

This command inserts words in the apparatus criticus without checking if both `ekd@isinapp` and `ekd@state` are set to `true`.

```
\NewDocumentCommand{\unconditional@appin}{o m}{%
  \IfNoValueTF{#1}
  {\luadirect{ekdosis.appin(\luastringO{#2})}}
  {\luadirect{ekdosis.appin(\luastringO{#2}, \luastringO{#1})}}%
}
```

`\blfootnote` `\blfootnote{`⟨*footnote*⟩`}` is used internally to insert the apparatus in the footnote block should the global optional argument `layout` be set to `footins`. Therefore, it is not documented.

```
% \def\blfootnote{\gdef\@thefnmark{\relax}\@footnotetext}
\def\blfootnote{\gdef\@thefnmark{}\@blfootnotetext}
\long\def\@blfootnotetext#1{\insert\footins{%
    \reset@font\footnotesize
    \interlinepenalty\interfootnotelinepenalty
    \splittopskip\footnotesep
    \splitmaxdepth \dp\strutbox \floatingpenalty \@MM
    \hsize\columnwidth \@parboxrestore
    \protected@edef\@currentlabel{%
       \csname p@footnote\endcsname\@thefnmark
    }%
    \color@begingroup
      \@makeblfntext{%
        \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
    \color@endgroup}}%
\newcommand\@makeblfntext[1]{%
    \parindent 1em%
    \noindent
    \hb@xt@0em{\hss\@makefnmark}#1}
```

Single-layer apparatus The following commands are for general settings. All of them can be used in the preamble or at any point of the document. The keys to be used follow:—

```
\newif\ifrtl@app
\edef\ekdsep{] }
\ekvdefinekeys{default@app}{
  choice direction = {LR = \rtl@appfalse,
    RL = \rtl@apptrue},
  unknown-choice direction = \PackageError{ekdosis}{unknown
    direction=#1}{`direction' must be either `LR' or `RL'.},
  code sep = \edef\ekdsep{#1},
  store bhook = \ekd@begin@apparatus,
  initial bhook = {},
  store ehook = \ekd@end@apparatus,
  initial ehook = {},
  store delim = \ekd@unit@delim,
  initial delim = {},
  store rule = \ekd@default@rule,
  initial rule = \rule{0.4\columnwidth}{0.4pt},
  noval norule = \def\ekd@default@rule{\mbox{}}
}
```

`\SetApparatus` All settings can also be defined as `key-value` options within the argument of `\SetApparatus`:—

```
\NewDocumentCommand{\SetApparatus}{m}{
  \ekvset{default@app}{#1}
}
```

`\SetLTRapp` `\SetRTLapp` `\SetLTRapp` and `\SetRTLapp` are two argument-less commands to set the direction of single-layer apparatus criticus, either LTR or RTL:—

```
\NewDocumentCommand{\SetRTLapp}{}{\rtl@apptrue}
\NewDocumentCommand{\SetLTRapp}{}{\rtl@appfalse}
```

`\SetSeparator` `\SetSeparator{`⟨*separator*⟩`}` allows to change the separator between lemma texts and variant readings, which is by default a closing square bracket followed by a space (`]␣`):—

```
\NewDocumentCommand{\SetSeparator}{m}{\edef\ekdsep{#1}}
```

`\SetBeginApparatus` `\SetBeginApparatus{`⟨*characters*⟩`}` can be used to append characters at the beginning of the apparatus block. By default, nothing is appended:—

```
\NewDocumentCommand{\SetBeginApparatus}{m}{\edef\ekd@begin@apparatus{#1}}
```

`\SetEndApparatus` `\SetEndApparatus{`⟨*characters*⟩`}` can be used to append characters at the end of the apparatus block—such as a period, as it is customary in some editions. By default, nothing is appended:—

```
\NewDocumentCommand{\SetEndApparatus}{m}{\edef\ekd@end@apparatus{#1}}
```

`\SetUnitDelimiter` `\SetUnitDelimiter{`⟨*delimiter*⟩`}` can be used to set the delimiter between entries in the apparatus criticus. By default, there is no delimiter except a simple space. `\SetUnitDelimiter` can be used to insert a broad space (with `\hskip` for instance, as in the OCT series) or the divider-sign (‖, as in the Budé series):—

```
\NewDocumentCommand{\SetUnitDelimiter}{m}{\def\ekd@unit@delim{#1}}
```

`\footnoteruletrue` `\footnoterulefalse` As ekdosis takes care of drawing a rule separating the main text from the apparatus block as well as layers of notes from each other inside this block, it may not be desirable to have the standard LaTeX "footnoterule" printed on every page of the edition text.

`\footnoterulefalse` removes it while `\footnoteruletrue` leaves it untouched. The latter is set by default.

```
\newif\iffootnoterule
\footnoteruletrue
\let\dflt@footnoterule\footnoterule
\let\dflt@pcol@footnoterule\pcol@footnoterule
\renewcommand\footnoterule{%
  \iffootnoterule
  \dflt@footnoterule%
  \fi
}
\renewcommand\pcol@footnoterule{%
  \iffootnoterule
  \dflt@pcol@footnoterule%
  \fi
}
```

`\SetDefaultRule` By default, ekdosis draws separating rules the definition of which is `\rule{0.4\columnwidth}{0.4pt}`. This can be changed in the preamble or at any point of the document with `\SetDefaultRule{`⟨*rule definition*⟩`}`. Leaving this argument empty as in `\SetDefaultRule{}` removes the rule.

```
\NewDocumentCommand{\SetDefaultRule}{m}{%
  \def\@tempa{#1}
  \ifx\@tempa\empty\def\ekd@default@rule{\mbox{}}%
  \else%
  \def\ekd@default@rule{#1}%
  \fi}
```

`\NLS` `\NLS` is adapted from a snippet written by Heiko Oberdiek. It is used by ekdosis internally to prevent page breaks between separating rules and subsequent notes. Therefore, it is not documented.

```
\newcommand*{\NLS}{%
  \par%
  \nobreak%
  \vspace{-\parskip}%
  \noindent%
  \ignorespaces}
```

This boolean is used to test if a given entry is to be preceded by a numeral referring to the line of the edition text.

```
\newif\ifsubsq@unit
\subsq@unittrue
```

`\add@@apparatus` inserts the apparatus block on a given page either in the footnote floating block or in a float of its own, depending on the value set in the `layout` global option.

```
\def\add@@apparatus{%
  \if@pkg@parnotes\parnotes\else\fi%
  \if@pkg@footins%
  \bgroup%
  \ifrtl@app\setRL\else\setLR\fi%
  \blfootnote{%
    \if@pkg@parnotes%
    \if@parnotesroman%
    \renewcommand*{\theparnotemark}{\roman{parnotemark}}\else\fi%
    \parnoteclear\else\fi%
```

```
    \footnotesize\apparatus\unless\ifekd@mapps\ekd@end@apparatus\fi%
    \if@pkg@parnotes\parnotes\parnotereset\else\fi%
  }%
  \egroup%
  \fi%
  \if@pkg@float%
  \keyparbox[!b]{}{\ifrtl@app\setRL\else\setLR\fi%
    \if@pkg@parnotes%
    \if@parnotesroman%
    \renewcommand*{\theparnotemark}{\roman{parnotemark}}\else\fi%
    \parnoteclear\else\fi%
    \ekd@appfontsize\apparatus\unless\ifekd@mapps\ekd@end@apparatus\fi%
    \if@pkg@parnotes\parnotes\parnotereset\else\fi%
  }%
  \fi%
}
```

Before inserting any new entry, `\add@apparatus` calls `\test@apparatus` to decide whether a new apparatus block must be created on a given page.

```
\def\add@apparatus{%
  \test@apparatus%
  \ifbool{do@app}{\subsq@unitfalse\add@@apparatus}{}%
}
```

`\append@app` inserts a bare (sub)entry in the apparatus...

```
\NewDocumentCommand{\append@app}{o +m}{%
  \ifekd@isinapp%
    \ifekd@state%
    \IfNoValueTF{#1}%
      {\luadirect{ekdosis.appin(\luastringO{#2})}}%
      {\luadirect{ekdosis.appin(\luastringO{#2}, \luastringO{#1})}}%
    \fi%
  \fi}
```

while `\append@ln@app` inserts a (sub)entry possibly preceded by a line number.

```
\NewDocumentCommand{\append@ln@app}{o +m}{%
  \IfNoValueTF{#1}
  {\luadirect{tex.sprint(ekdosis.mdvappend(\luastringO{#2}))}}
  {\luadirect{tex.sprint(ekdosis.mdvappend(\luastringO{#2},
      \luastringO{#1}))}}}
```

Lineation settings

`\outerlinenumbers` `\innerlinenumbers`

ekdosis does not use the "pagewise" numbering mode that is provided by lineno. Therefore, `\outerlinenumbers` and `\innerlinenumbers` are defined in addition to `\rightlinenumbers` and `\leftlinenumbers`.

```
\def\outerlinenumbers{
  \def\makeLineNumberRunning{
    \checkoddpage
    \ifoddpage
    \linenumberfont\hskip\linenumbersep\hskip\textwidth
    \hbox to\linenumberwidth{\hss\LineNumber}\hss
    \else
    \hss\linenumberfont\LineNumber\hskip\linenumbersep
    \fi
  }
```

```
}
\def\innerlinenumbers{
  \def\makeLineNumberRunning{
    \checkoddpage
    \ifoddpage
    \hss\linenumberfont\LineNumber\hskip\linenumbersep
    \else
    \linenumberfont\hskip\linenumbersep\hskip\textwidth
    \hbox to\linenumberwidth{\hss\LineNumber}\hss
    \fi
  }
}
```

The keys to be used for lineation settings follow. A conditional is defined beforehand so that ekdosis may know whether the numbering should start afresh at the top of each page.

```
\newif\ifekd@pagelineation
\NewDocumentCommand{\ekdatbegshihook}{}{%
  \ifekd@pagelineation\resetlinenumber\fi
}
\AtBeginShipout{\ekdatbegshihook}
\newif\ifekd@elidednumbers
\ekvdefinekeys{ekd@lineation}{
  choice lineation = {page = \ekd@pagelineationtrue,
    document = \ekd@pagelineationfalse},
  unknown-choice lineation = \PackageError{ekdosis}{unknown
    lineation=#1}{`lineation' must be either `page' or `document'.},
  code modulonum = \chardef\c@linenumbermodulo#1\relax,
  noval modulo = \modulolinenumbers,
  choice numbers = {elided = \ekd@elidednumberstrue,
    full = \ekd@elidednumbersfalse},
  unknown-choice numbers = \PackageError{ekdosis}{unknown
    numbers=#1}{`numbers' must be either `elided' or `full'.},
  initial numbers = elided,
  choice margin = {right = \rightlinenumbers,
    left = \leftlinenumbers,
    inner = \innerlinenumbers,
    outer = \outerlinenumbers},
  unknown-choice margin = \PackageError{ekdosis}{unknown
    margin=#1}{`margin' must be either `left', `right', \MessageBreak
    `inner' or `outer'}
}
```

\SetLineation Then `\SetLineation{`⟨*options*⟩`}` can be used in the preamble or at any point of the document to set lineation preferences. Its argument processes the `key-value` options that are defined just above.

```
\NewDocumentCommand{\SetLineation}{m}{
  \ekvset{ekd@lineation}{#1}
}
```

Use `\normalfont` for line numbers:—

```
\renewcommand\linenumberfont{\normalfont\footnotesize}
```

\SetDefaultApparatus By default, ekdosis defines one layer of critical notes which is called `default`. This name can be changed at any point of the document with `\SetDefaultApparatus{`⟨*name*⟩`}`.

```
\ekvdefinekeys{appnote}{
```

```
  store type = \ekdan@type,
  initial type = default
}
\NewDocumentCommand{\SetDefaultApparatus}{m}{%
 \ekvset{appnote}{type=#1}}
```

\app `\app[type=⟨type⟩]{⟨apparatus entries⟩}` takes one mandatory argument and accepts one optional argument. `type=` refers to the layer the note must go into and ⟨*apparatus entries*⟩ contains command used to insert the entries, either `\lem`, `\rdg` or `\note`⟨*⟩:—

```
\NewDocumentCommand{\app}{O{} > { \TrimSpaces } +m}{%
 \begingroup
 \ekvset{appnote}{#1}%
 \ekd@isinapptrue%
 \stepcounter{ekd@lab}%
 \zlabel{ekd:\theekd@lab}%
 \luadirect{ekdosis.storeabspg(
   \luastring{\zref@extract{ekd:\theekd@lab}{abspage}})}%
 \ifekd@state\add@apparatus\fi%
 \luadirect{tex.sprint(ekdosis.removesp(\luastringN{#2}))}%
 \ekd@isinappfalse%
 \endgroup}
```

`\current@ref@arg` is used outside `\app` by `\note`. It takes two mandatory arguments: the beginning line label and the ending line label—which are manually inserted—and returns the formatted reference to be inserted in the apparatus criticus.

```
\def\current@ref@arg#1#2{{%\textdir TLT%
    \unexpanded\expandafter{\ekd@refnumstyle}%
    \ifnum%
    \getpagerefnumber{#1}
    =
    \getpagerefnumber{#2}
    \ifnum%
    \getrefnumber{#1}
    =
    \getrefnumber{#2}
    %
    \ifekd@mapps%
    \ifbool{subsq@unit@\ekdan@type}{%
      \ifnum%
      \getrefnumber{#1}
      =
      \getrefnumber{\luadirect{tex.sprint(ekdosis.getprevnotelab())}}
      \else
      \LRnum{\getrefnumber{#1}}% issue the no
      \fi%
    }%
    {\LRnum{\getrefnumber{#1}}}% issue the no
    \else
    \ifsubsq@unit%
    %
    \ifnum%
    \getrefnumber{#1}
    =
    \getrefnumber{\luadirect{tex.sprint(ekdosis.getprevnotelab())}}
    \else
```

```
    \LRnum{\getrefnumber{#1}}% issue the no
    \fi
    %
    \else
    \LRnum{\getrefnumber{#1}}% issue the no
    \fi
    \fi
    %
    \else
    \ifekd@elidednumbers
    \luadirect{tex.sprint(ekdosis.numrange(\luastring{\getrefnumber{#1}},
      \luastring{\getrefnumber{#2}}))}%
    \else
    \LRnum{\getrefnumber{#1}}--%
    \LRnum{\getrefnumber{#2}}% issue the nos
    \fi
    \fi%
    \else
    \LRnum{\getrefnumber{#1}}--%
    \LRnum{\getpagerefnumber{#2}}.%
    \LRnum{\getrefnumber{#2}}% issue pg and ln nos
    \fi%
  }\unexpanded\expandafter{\ekd@postrefnum}%
}
```

`\current@ref` is pretty much the same as `\current@reg@arg`, but takes no argument. It is used by commands such as `\lem` when references to page and line numbers can be returned by Lua.

```
\def\current@ref{{%\textdir TLT%
    \unexpanded\expandafter{\ekd@refnumstyle}%
    \ifnum%
    \getpagerefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}
    =
    \getpagerefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-e}
    \ifnum%
    \getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}
    =
    \getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-e}
    %
    \ifekd@mapps%
    \ifbool{subsq@unit@\ekdan@type}{%
      \ifnum%
      \getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}
      =
      \getrefnumber{\luadirect{tex.sprint(ekdosis.getprevlnlab())}-b}
      \else
      \LRnum{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}}% issue the no
      \fi%
    }{\LRnum{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}}}% issue the no
    \else
    \ifsubsq@unit%
    %
    \ifnum%
    \getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}
    =
    \getrefnumber{\luadirect{tex.sprint(ekdosis.getprevlnlab())}-b}
```

```
    \else
    \LRnum{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}}% issue the no
    \fi
    %
    \else
    \LRnum{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}}% issue the no
    \fi
    \fi
    %
    \else
    \ifekd@elidednumbers
    \luadirect{tex.sprint(ekdosis.numrange(
      \luastring{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}},
      \luastring{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-e}}))}% issue the nos
    \else
    \LRnum{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}}--%
    \LRnum{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-e}}% issue the nos
    \fi
    \fi%
    \else
    \LRnum{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-b}}--%
    \LRnum{\getpagerefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-e}}.%
    \LRnum{\getrefnumber{\luadirect{tex.sprint(ekdosis.getlnlab())}-e}}% issue pg and ln nos
    \fi%
  }\unexpanded\expandafter{\ekd@postrefnum}%
}
```

Define keys to be used by the optional arguments of `\lem` and `\rdg`:—

```
\ekvdefinekeys{lem}{
  code wit = \def\ekdlr@wit{#1},
  code alt  = \def\ekdlr@alt{#1},
  code pre = \def\ekdlr@pre{#1},
  code post = \def\ekdlr@post{#1},
  code prewit = \def\ekdlr@prewit{#1},
  code postwit = \def\ekdlr@postwit{#1},
  store type = \ekdlr@type,
  store sep = \ekdl@sep,
  bool nolem = \ifekdl@nolem,
  bool nosep = \ifekdl@nosep,
  initial sep = \ekdsep
}
\ekvdefinekeys{rdg}{
  code wit = \def\ekdlr@wit{#1},
  code alt  = \def\ekdlr@alt{#1},
  code pre = \def\ekdlr@pre{#1},
  code post = \def\ekdlr@post{#1},
  code prewit = \def\ekdlr@prewit{#1},
  code postwit = \def\ekdlr@postwit{#1},
  store type = \ekdlr@type,
  bool nordg = \ifekdr@nordg
}
```

`\lem` `\lem[`⟨*options*⟩`]{`⟨*lemma text*⟩`}` inserts ⟨*lemma text*⟩ both in the edition text and in the apparatus criticus by default, preceded by the reference to the line number or a space if it is the same number as the one of the previous entry. This command accepts the optional key-value arguments just defined above.

```
\NewDocumentCommand{\lem}{O{} m}{%
  \ekd@isinlemtrue%
  \luadirect{ekdosis.dolnlab(\luastringN{#2})}%
  \null
  \bgroup%
  \ekvset{lem}{#1}%
  \ifekd@mapps%
    \ifnum%
    \luadirect{tex.sprint(ekdosis.get_bagunits(\luastringO{\ekdan@type}))}
    = 1
    \boolfalse{subsq@unit@\ekdan@type}%
    \fi%
    \luadirect{ekdosis.increment_bagunits(\luastringO{\ekdan@type})}%
    \def\ekd@munit@delim{%
      \luadirect{tex.sprint(ekdosis.getappdelim(\luastringO{\ekdan@type}))}}%
    \luadirect{tex.sprint(ekdosis.limit_bagunits(\luastringO{\ekdan@type}))}%
  \fi%
  \ifekdl@nolem\edef\lem@app{%
    % \hskip .75em
    \ifekd@mapps
    \ifbool{subsq@unit@\ekdan@type}%
    {\ekd@munit@delim}{}%
    \else%
    \ifsubsq@unit\unexpanded\expandafter{\ekd@unit@delim}\fi%
    \fi%
    \current@ref}%\hskip .25em}%
  \else%
  \ifbool{al@rlmode}{%
    \edef\lem@app{%
      % \hskip .75em
      \ifekd@mapps
      \ifbool{subsq@unit@\ekdan@type}%
      {\ekd@munit@delim}{}%
      \else%
      \ifsubsq@unit\unexpanded\expandafter{\ekd@unit@delim}\fi%
      \fi%
      \current@ref%\hskip .25em
      \ifdefined\ekdlr@alt%
        \ifdefined\ekdlr@post%
          \space\unexpanded\expandafter{\ekdlr@post}\space\else\fi
        {\textdir TRT\unexpanded\expandafter{\ekdlr@alt}}%
        \ifdefined\ekdlr@pre%
          \space\unexpanded\expandafter{\ekdlr@pre}\space\else\fi
      \else
        \ifdefined\ekdlr@post%
          \space\unexpanded\expandafter{\ekdlr@post}\space\else\fi
        {\textdir TRT\unexpanded{#2}}%
        \ifdefined\ekdlr@pre%
          \space\unexpanded\expandafter{\ekdlr@pre}\space\else\fi
      \fi
      \ifdefined\ekdlr@postwit%
        \space\unexpanded\expandafter{\ekdlr@postwit}\else\fi
      \ifdefined\ekdlr@wit\space\getsiglum{\ekdlr@wit}\else\fi
      \ifdefined\ekdlr@prewit%
        \space\unexpanded\expandafter{\ekdlr@prewit}\space\else\fi
```

```
      \ifekdl@nosep\else\unexpanded\expandafter{\ekdl@sep}\fi
    }%
  }%
  {%
    \edef\lem@app{%
      % \hskip .75em
      \ifekd@mapps
      \ifbool{subsq@unit@\ekdan@type}%
      {\ekd@munit@delim}{}%
      \else%
      \ifsubsq@unit\unexpanded\expandafter{\ekd@unit@delim}\fi%
      \fi%
      \current@ref%\hskip .25em
      \ifdefined\ekdlr@alt%
        \ifdefined\ekdlr@pre%
          \space\unexpanded\expandafter{\ekdlr@pre}\space\else\fi
        \ltx@ifpackageloaded{babel}%
          {\noexpand\selectlanguage{\languagename}%
            \unexpanded\expandafter{\ekdlr@alt}}%
          {\unexpanded\expandafter{\ekdlr@alt}}%
        \ifdefined\ekdlr@post%
          \space\unexpanded\expandafter{\ekdlr@post}\space\else\fi
      \else
        \ifdefined\ekdlr@pre%
          \space\unexpanded\expandafter{\ekdlr@pre}\space\else\fi
          \ltx@ifpackageloaded{babel}%
          {{\noexpand\selectlanguage{\languagename}\unexpanded{#2}}}{%
            {\unexpanded{#2}}}%
        \ifdefined\ekdlr@post%
          \space\unexpanded\expandafter{\ekdlr@post}\space\else\fi
      \fi
      \ifdefined\ekdlr@prewit%
        \space\unexpanded\expandafter{\ekdlr@prewit}\space\else\fi
      \ifdefined\ekdlr@wit\space\getsiglum{\ekdlr@wit}\else\fi
      \ifdefined\ekdlr@postwit%
        \space\unexpanded\expandafter{\ekdlr@postwit}\else\fi
      \ifekdl@nosep\else\unexpanded\expandafter{\ekdl@sep}\fi
    }%
  }%
  \fi%
  \ifekd@mapps%
  \append@ln@app[\ekdan@type]{\lem@app}%
  \else%
  \append@ln@app{\lem@app}%
  \fi%
  \egroup%
  \ekd@isinlemfalse%
  \subsq@unittrue%
}
```

\rdg `\rdg[⟨options⟩]{⟨variant reading⟩}` inserts ⟨*variant reading*⟩ in the second part of the entry, after the lemma text and the separator, in the apparatus criticus. This command accepts the optional key-value arguments defined above.

```
\NewDocumentCommand{\rdg}{O{} m}{%
  \bgroup%
```

```
\ekvset{rdg}{#1}%
% \ifekdr@nordg\append@app{}\else% do we need \append@app{} here? If
%                                % so, keep in mind \ifekd@mapps,
%                                like so:
\ifekdr@nordg%
  \ifekd@mapps%
    \append@app[\ekdan@type]{}%
  \else%
  \append@app{}%
  \fi%
\else%
\ifbool{al@rlmode}{%
  \edef\rdg@app{%
    \ifdefined\ekdlr@alt%
      \ifdefined\ekdlr@post%
        \space\unexpanded\expandafter{\ekdlr@post}\space\else\fi
      {\textdir TRT\unexpanded\expandafter{\ekdlr@alt}}%
      \ifdefined\ekdlr@pre%
        \space\unexpanded\expandafter{\ekdlr@pre}\space\else\fi
    \else
      \ifdefined\ekdlr@post%
        \space\unexpanded\expandafter{\ekdlr@post}\space\else\fi
      {\textdir TRT\unexpanded{#2}}%
      \ifdefined\ekdlr@pre%
        \space\unexpanded\expandafter{\ekdlr@pre}\space\else\fi
    \fi
    \ifdefined\ekdlr@postwit%
      \space\unexpanded\expandafter{\ekdlr@postwit}\else\fi
    \ifdefined\ekdlr@wit\space\getsiglum{\ekdlr@wit}\else\fi
    \ifdefined\ekdlr@prewit%
      \space\unexpanded\expandafter{\ekdlr@prewit}\space\else\fi
  }%
}%
{%
  \edef\rdg@app{%
    \ifdefined\ekdlr@alt%
      \ifdefined\ekdlr@pre%
        \space\unexpanded\expandafter{\ekdlr@pre}\space\else\fi
      \ltx@ifpackageloaded{babel}%
        {\noexpand\selectlanguage{\languagename}%
          \unexpanded\expandafter{\ekdlr@alt}}%
        {\unexpanded\expandafter{\ekdlr@alt}}%
      \ifdefined\ekdlr@post%
        \space\unexpanded\expandafter{\ekdlr@post}\space\else\fi
    \else
      \ifdefined\ekdlr@pre%
        \space\unexpanded\expandafter{\ekdlr@pre}\space\else\fi
        \ltx@ifpackageloaded{babel}%
        {{\noexpand\selectlanguage{\languagename}\unexpanded{#2}}}{%
          {\unexpanded{#2}}}%
      \ifdefined\ekdlr@post%
        \space\unexpanded\expandafter{\ekdlr@post}\space\else\fi
    \fi
    \ifdefined\ekdlr@prewit%
      \space\unexpanded\expandafter{\ekdlr@prewit}\space\else\fi
```

```
      \ifdefined\ekdlr@wit\space\getsiglum{\ekdlr@wit}\else\fi
      \ifdefined\ekdlr@postwit%
        \space\unexpanded\expandafter{\ekdlr@postwit}\else\fi
    }%
  }%
  \ifekd@mapps%
      \append@app[\ekdan@type]{\rdg@app}%
  \else%
  \append@app{\rdg@app}%
  \fi%
  \fi%
  \egroup%
}
```

Define keys to be used by the optional argument of `\note` when this command is found outside `\app`:—

```
\ekvdefinekeys{note}{
  store type = \ekdan@type,
  store lem = \ekdn@lem,
  code labelb = \def\ekdn@labelb{#1},
  code labele = \def\ekdn@labele{#1},
  store sep = \ekdn@sep,
  bool nosep = \ifekdn@nosep,
  initial type = default,
  initial sep = \ekdsep
}
```

`\note@noapp` is used internally when a `\note` command is found outside `\app`. This command is mostly used to insert short comments or references to texts quoted or cited in the edition text to go into additional layers of the apparatus criticus, e.g. the *apparatus testium*. It accepts the optional key-value arguments just defined above. It must be noted that `labelb` must be specified; otherwise ekdosis will issue an error message.

```
\NewDocumentCommand{\note@noapp}{O{} +m}{%
  \null
  \bgroup%
  \ekvset{note}{#1}%
  \stepcounter{ekd@lab}%
  \zlabel{ekd:\theekd@lab}%
  \luadirect{ekdosis.storeabspg(
    \luastring{\zref@extract{ekd:\theekd@lab}{abspage}})}%
  \ifekd@state\add@apparatus\fi%
  \ifekd@mapps%
    \ifnum%
      \luadirect{tex.sprint(ekdosis.get_bagunits(\luastringO{\ekdan@type}))}
      = 1
      \boolfalse{subsq@unit@\ekdan@type}%
    \fi%
  \luadirect{ekdosis.increment_bagunits(\luastringO{\ekdan@type})}%
    \def\ekd@munit@delim{%
      \luadirect{tex.sprint(ekdosis.getappdelim(\luastringO{\ekdan@type}))}}%
    \luadirect{tex.sprint(ekdosis.limit_bagunits(\luastringO{\ekdan@type}))}%
  \fi%
  \ifdefined\ekdn@labelb%
    \luadirect{tex.sprint(ekdosis.setnotelab(\luastringO{\ekdn@labelb}))}%
    \ifdefined\ekdn@labele\else\def\ekdn@labele{\ekdn@labelb}\fi%
  \else\PackageError{ekdosis}{missing labelb}{`labelb' must be
```

```
    set.}\fi%
  \ifbool{al@rlmode}%
  {\edef\note@contents{%
      % \hskip .75em
      \ifekd@mapps
        \ifbool{subsq@unit@\ekdan@type}%
        {\ekd@munit@delim}{}%
      \else%
        \ifsubsq@unit\unexpanded\expandafter{\ekd@unit@delim}\fi%
      \fi%
      \current@ref@arg{\ekdn@labelb}{\ekdn@labele}%\hskip .25em
      \ifdefined\ekdn@lem%
          {\textdir TRT\unexpanded\expandafter{\ekdn@lem}}%
          \unless\ifekdn@nosep
          \unexpanded\expandafter{\ekdn@sep}\fi
          \else\fi%
            {\textdir TRT\unexpanded{#2}}}}%
  {\edef\note@contents{%
      % \hskip .75em
      \ifekd@mapps
        \ifbool{subsq@unit@\ekdan@type}%
        {\ekd@munit@delim}{}%
      \else%
        \ifsubsq@unit\unexpanded\expandafter{\ekd@unit@delim}\fi%
      \fi%
      \current@ref@arg{\ekdn@labelb}{\ekdn@labele}%\hskip .25em
      \ifdefined\ekdn@lem
        \ltx@ifpackageloaded{babel}%
          {\noexpand\selectlanguage{\languagename}%
            \unexpanded\expandafter{\ekdn@lem}}%
          {\unexpanded\expandafter{\ekdn@lem}}%
          \unless\ifekdn@nosep
          \unexpanded\expandafter{\ekdn@sep}\fi
          \else\fi%
          \ltx@ifpackageloaded{babel}%
          {{\noexpand\selectlanguage{\languagename}\unexpanded{#2}}}{%
            {\unexpanded{#2}}}}}%
  \ifekd@mapps%
  \unconditional@appin[\ekdan@type]{\note@contents}%
  \else%
  \unconditional@appin{\note@contents}%
  \fi%
    \luadirect{ekdosis.setprevnotelab(\luastring0{\ekdn@labelb})}%
  \egroup
  \subsq@unittrue
  \ignorespaces
}
```

Define keys to be used by the optional argument of `\note` when this command is found inside `\app`:—

```
\ekvdefinekeys{ekd@note}{
  store pre = \pre@value,
  store post = \post@value
}
```

The following three commands, `\note@app`, `\ekd@note` and `\ekd@note@star` are used internally when a `\note` command is found inside `\app`. These commands are used to

insert short comments after the lemma text or after any variant reading in the apparatus criticus. `\note@app` and subsequently `\ekd@note` and `\ekd@note@star` accept the optional key-value arguments just defined above.

```
\NewDocumentCommand{\ekd@note}{O{} m}{%
  \bgroup%
  \ekvset{ekd@note}{#1}%
  \edef\note@contents{%
    \ekvifdefinedNoVal{note}{pre}{}{%
      \unexpanded\expandafter{\pre@value}}%
    {\unexpanded{#2}}%
    \ekvifdefinedNoVal{note}{post}{}{%
      \unexpanded\expandafter{\post@value}}%
  }%
  \append@app{\note@contents}%
  \egroup%
}
\NewDocumentCommand{\ekd@note@star}{O{} m}{%
  \if@pkg@parnotes
    \bgroup%
      \ekvset{ekd@note}{#1}%
      \edef\note@contents{%
        \ekvifdefinedNoVal{note}{pre}{}{%
          \unexpanded\expandafter{\pre@value}}%
        \unskip\noexpand\parnote{\unexpanded{#2}}%
        \ekvifdefinedNoVal{note}{post}{}{%
          \unexpanded\expandafter{\post@value}}%
      }%
      \append@app{\note@contents}%
    \egroup%
  \else
    \append@app{\unskip\footnote{#2}}%
  \fi%
}
\NewDocumentCommand{\note@app}{s O{} +m}{%
  \ifbool{al@rlmode}{%
    \IfBooleanTF{#1}{\ekd@note@star[#2]{%
          {\textdir TRT#3}}}
    {\ekd@note[#2]{{\textdir TRT#3}}}%
  }{%
    \IfBooleanTF{#1}{\ekd@note@star[#2]{#3}}
    {\ekd@note[#2]{#3}}%
  }%
}
```

`\note` Finally, `\note` is a simple command designed to check whether `\note` itself is called inside or outside `\app`. Then, unless it is found inside `\lem`, it calls `\note@app` in the former case and `\note@noapp` in the latter case:—

```
\NewDocumentCommand{\note}{s O{} +m}{%
  \ifekd@state%
    \ifekd@isinapp%
      \ifekd@isinlem%
        \note@noapp[#2]{#3}%
      \else%
        \IfBooleanTF{#1}{\note@app*[#2]{#3}}{\note@app[#2]{#3}}%
      \fi%
```

```
    \else%
      \note@noapp[#2]{#3}%
      \fi%
  \fi%
}
```

`\apparatus` is used internally by ekdosis to print the apparatus at the bottom of pages. Therefore, it is not documented, but this may change in the future for it will be possible to have apparatuses printed at other places.

```
\NewDocumentCommand{\apparatus}{}{%
  \luadirect{tex.sprint(ekdosis.appout())}}
```

The following two commands call Lua functions to check whether an apparatus should be printed on a given page and to store the current column id.

```
\NewDocumentCommand{\test@apparatus}{}{%
  \luadirect{tex.sprint(ekdosis.testapparatus())}}
\NewDocumentCommand{\ekd@storecol}{}{%
  \luadirect{ekdosis.storecurcol(\luastring{\thecolumn})}%
}
```

Start and stop `ekdosis`:

```
\NewDocumentCommand{\EkdosisOn}{}{%
  \ekd@statetrue}
\NewDocumentCommand{\EkdosisOff}{}{%
  \ekd@statefalse%
}
```

Neutralize unwanted commands provided by lineno within the `ekdosis` environment:—

```
\def\ekd@setlineno{%
  \let\setpagewiselinenumbers\relax%
  \let\pagewiselinenumbers\relax%
  \let\endpagewiselinenumbers\relax%
  \let\runningpagewiselinenumbers\relax%
  \let\realpagewiselinenumbers\relax%
}
```

`ekdosis` Finally comes the `ekdosis` environment meant to receive the edition text equipped with an apparatus criticus. This environment collects its contents and delivers it to Lua functions if a `TEI xml` output file be desired.

```
\NewDocumentEnvironment{ekdosis}{+b}{%
  \ekd@setlineno%
  \runninglinenumbers
    \EkdosisOn#1}{%
    \EkdosisOff
  \endrunninglinenumbers%
  \iftei@export
  \luadirect{ekdosis.exporttei(\luastringN{\par #1\par })}\fi}
```

Alignment What follows is to arrange texts in parallel columns either on single pages or on facing pages.

Define keys to be used by the `alignment` environment:—

```
\ekvdefinekeys{ekd@align}{
  store tcols = \tcols@num,
  store lcols = \lcols@num,
  store texts = \texts@value,
```

```
  store apparatus = \apparatus@value,
  bool paired = \ifekd@paired,
  choice lineation = {page = \ekd@pagelineationtrue,
                      document = \ekd@pagelineationfalse},
  unknown-choice lineation = \PackageError{ekdosis}{unknown
    lineation=#1}{`lineation' must be either `page' or `document'.},
  choice segmentation = {auto = \def\segmentation@val{auto},
                         noauto = \def\segmentation@val{noauto}},
  unknown-choice segmentation = \PackageError{ekdosis}{unknown
    segmentation=#1}{`segmentation' must be either `auto' or
    `noauto'.},
  bool flush = \ifekd@flushapp,
  initial tcols = 2,
  initial lcols = 1,
  initial texts = edition;translation,
  initial apparatus = edition,
  default segmentation = auto
}
```

\SetAlignment `\SetAlignment{`⟨*settings*⟩`}` can be used either in the preamble or at any point of the document to set or modify the keys-value settings just defined above.

```
\NewDocumentCommand{\SetAlignment}{m}{
  \ekvset{ekd@align}{#1}
}
```

Patch paracol to insert a hook in `\pcol@nextpage`. This hook is used to reset line numbers on new pages.

```
\patchcmd{\pcol@nextpage}{%
  \endgroup}{%
  \ifekd@pagelineation\resetlinenumber\fi
  \endgroup}{}{}
```

`\EkdosisColStart` and `\EkdosisColStop` initialize columns meant to receive edition texts. These commands are used internally by ekdosis.

```
\NewDocumentCommand{\EkdosisColStart}{}{%
  \ekd@setlineno%
  \runninglinenumbers
  \ekd@storecol%
  \stepcounter{ekd@lab}%
  \zlabel{ekd:\theekd@lab}%
  \luadirect{%
    ekdosis.storeabspg(\luastring{\zref@extract{ekd:\theekd@lab}{abspage}},
    "pg_i")}%
  \ifekd@pagelineation
    \luadirect{tex.sprint(ekdosis.checkresetlineno())}
  \fi
}
\NewDocumentCommand{\EkdosisColStop}{}{%
  \stepcounter{ekd@lab}%
  \zlabel{ekd:\theekd@lab}%
  \luadirect{%
    ekdosis.storeabspg(\luastring{\zref@extract{ekd:\theekd@lab}{abspage}},
    "pg_ii")}%
  \endrunninglinenumbers%
}
```

alignment `\begin{alignment}[`⟨*options*⟩`]`...`\end{alignment}` can be used as it is provided to typeset a standard critical edition text on the left-hand pages accompanied with a translation on the right-hand pages. To that effect, it provides by default two new environments, `edition` and `translation`, to be used to typeset both texts. (Either whole texts or texts entered by paragraphs alternately.) The optional argument of `alignment` accepts the exact same key-value options as `\SetAlignment` described above. One may contrast these options with those accepted by `\SetAlignment` as "local settings".

```
\NewDocumentEnvironment{alignment}{O{}}
{%
  \ekvset{ekd@align}{#1}%
  \luadirect{ekdosis.mkenvdata(
    \luastring{\texts@value},
    "texts"
    )}
  \ifekd@flushapp
    \luadirect{ekdosis.newalignment("set")}
  \fi
  \luadirect{ekdosis.mkenvdata(
    \luastring{\apparatus@value}, "apparatus"
    )}
  \setrunninglinenumbers
  \luadirect{tex.sprint(ekdosis.mkenv())}
  \ifekd@paired
  \begin{paracol}[\lcols@num]{\tcols@num}
  \else
  \begin{paracol}[\lcols@num]*{\tcols@num}
  \fi
  }
  {\end{paracol}
  \iftei@export\luadirect{ekdosis.export_coldata_totei()}\fi
  \ifekd@flushapp
    \luadirect{ekdosis.newalignment("reset")}
  \fi
  \luadirect{ekdosis.flushenvdata()}
  \luadirect{ekdosis.flushcolnums()}
  }
```

Divisions of the Body ekdosis can convert `\book`, `\part`, `\chapter`, `\section`, `\subsection` and `\subsubsection` into corresponding `TEI` 'numbered' `<div`$_n$`>` elements, where $1 \leq n \leq 6$.

`\MkBodyDivs` `\MkBodyDivs` is used to let ekdosis know which sectional commands are actually being used in an edition text. This command takes six mandatory arguments. For example, if `\section` and `\subsection` are the only sectional commands being used, `\MkBodyDivs{section}{subsection}{}{}{}{}` will have `\section` and `\subsection` converted into `<div1>` and `<div2>` respectively.

```
\NewDocumentCommand{\MkBodyDivs}{mmmmmm}{
  \luadirect{ekdosis.mkdivdepths(
    \luastringN{#1},
    \luastringN{#2},
    \luastringN{#3},
    \luastringN{#4},
    \luastringN{#5},
    \luastringN{#6}
```

```
    )
  }
}
```

Divisions specific to ekdosis. Define keys to be used by `\ekddiv`:—

```
\ekvdefinekeys{ekd@div}{
  code type = \def\type@value{#1},
  code n = \def\n@value{#1},
  code head = \def\head@value{#1},
  code barehead = \def\barehead@value{#1},
  store depth = \depth@value,
  choice toc = {book = \def\toc@value{book},
                part = \def\toc@value{part},
                chapter = \def\toc@value{chapter},
                section = \def\toc@value{section},
                subsection = \def\toc@value{subsection},
                subsubsection = \def\toc@value{subsubsection},
                paragraph = \def\toc@value{paragraph},
                subparagraph = \def\toc@value{subparagraph}},
  unknown-choice toc = \PackageError{ekdosis}{unknown toc=#1}{`toc'
    must be either `book', `part', `chapter', `section', `subsection',
    \MessageBreak `subsubsection', `paragraph' or `subparagraph'.},
  initial depth = 1
}
```

`\FormatDiv` `\FormatDiv{⟨n⟩}{⟨code before⟩}{⟨code after⟩}` is used to lay out the heading of the title. It takes three mandatory arguments: *n*, namely the number referring to the particular depth of the division, and then some LaTeX formatting commands to go before and after the heading itself:—

```
\NewDocumentCommand{\FormatDiv}{m m m}{
  \luadirect{ekdosis.fmtdiv(\luastring{#1},
    \luastringN{#2},
    \luastringN{#3})}
}
```

`\ekd@getfmtdiv` gets the formatting commands that have been stored by `\FormatDiv`.

```
\NewDocumentCommand{\ekd@getfmtdiv}{m m}{%
  \luadirect{tex.sprint(ekdosis.getfmtdiv(\luastringO{#1},
    \luastringN{#2}))}%
}
```

`\ekddiv` `\ekddiv{⟨key-value arguments⟩}` is the standard command provided by ekdosis to meet the requirements of classical and literary texts the divisions of which depend on many different received traditions. It takes one mandatory argument in which the key-value arguments defined above are accepted, and converts the divisions into TEI 'un-numbered' `<div>` elements.

```
\NewDocumentCommand{\ekddiv}{m}{
  \begingroup
  \ekvset{ekd@div}{#1}%
  \ifdefined\head@value
    \bgroup
      \ekd@getfmtdiv{\depth@value}{b}%
      \head@value
      \ekd@getfmtdiv{\depth@value}{e}%
    \egroup
```

```
      \ifdefined\toc@value
        \ltx@ifpackageloaded{hyperref}{\phantomsection}{}%
          \ifdefined\barehead@value
            \addcontentsline{toc}{\toc@value}{\barehead@value}%
          \else
            \addcontentsline{toc}{\toc@value}{\head@value}%
          \fi
      \fi
  \fi
  \endgroup
}
```

A very basic and provisional implementation of poetry lines follows:—

```
\newlength{\ekdverseindentlength}
\setlength{\ekdverseindentlength}{\parindent}
\newenvironment*{ekdverse}[1][\ekdverseindentlength]{
  \begin{list}{}{%
      \setlength{\leftmargin}{#1}
      \setlength{\itemsep}{0pt}
      \setlength{\topsep}{0pt}
      \setlength{\partopsep}{0pt}
    }
  \item[]
  }{\end{list}}
```

ekdpar When autopar is set to false by means of \SetTEIxmlExport, ekdpar—or any other environment set to be inserted within <p> elements—must be used so that ekdosis can be informed of paragraph boundaries.

```
\NewDocumentEnvironment{ekdpar}{}{\par}{\par}
```

17 Change History

v0.99a

General: First public release

(documentation in progress) 2

18 Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

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