

Paolo Monella

La tabella dei segni
nell'edizione scientifica digitale:
un approccio saussuriano

The table of signs
in the scholarly digital edition:
a Saussurian approach



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<http://www1.unipa.it/paolo.monella/calabriatabella2019/index.html>

Philosophy of Language and Digital Humanities

University of Calabria (Rende, CS, Italy)

Saussurian tradition session

May 8, 2019



Outline

- Digital encoding of handwritten writing systems
 - Saussure
 - Table of signs (of all graphemes in a witness)
 - Possible implementations
 - Processing

Saussure

Ferdinand De
Saussure

Relational nature
of signs
within a semiotic
system



Ceci n'est pas un linguiste.

Saussure

MS A

a b c d e f g h **i** l m n o p q r s t **u** z . :

MS B

a b c d e f g h **i j** l m n o p q r s t **u v** z . , :

Saussure

MS A

a b c d e f g h **i** l m n o p q r s t **u** z . :

MS B

a b c d e f g h **i j** l m n o p q r s t **u v** z . , :



Saussure

MS A

a b c d e f g h **i** l m n o p q r s t **u** z . :

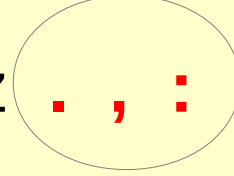
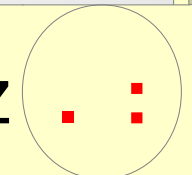
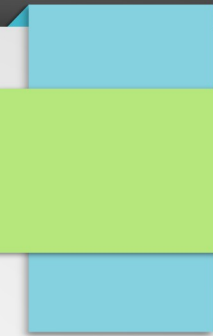
yes: sir

U+003A

MS B

a b c d e f g h **i j** l m n o p q r s t **u v** z . , :

he said: alas



Saussure

MS A

a b c d e f g h **i** l m n o p q r s t **u** z . :

Euery noun

U+0075

≠

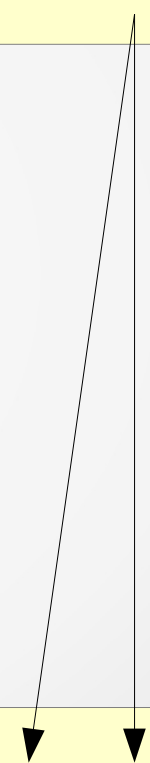
U+0076

U+0075

MS B

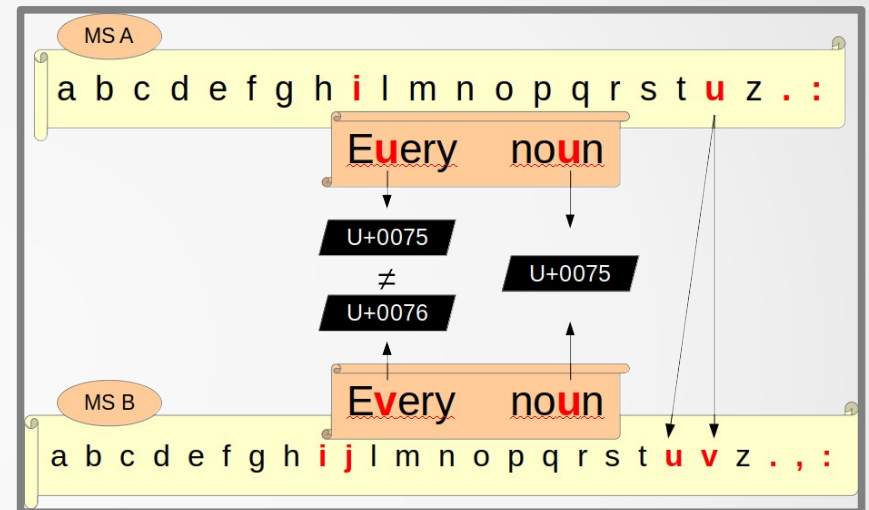
a b c d e f g h **i j** l m n o p q r s t **u v** z . , :

Every noun



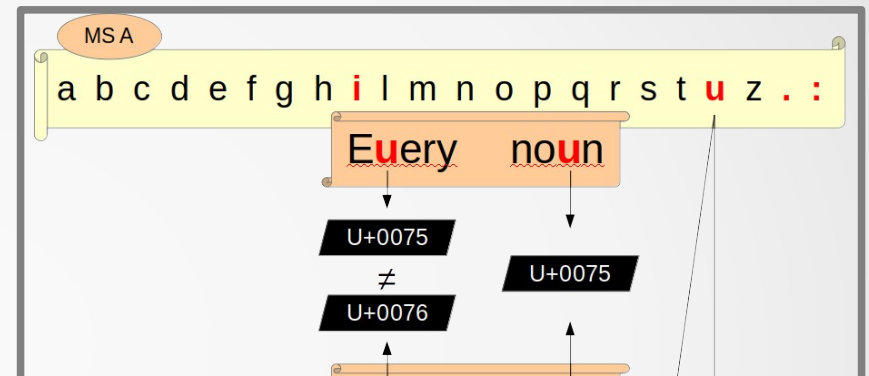
T. Orlandi: “table of signs”

- Tito Orlandi,
*Informatica testuale. Teoria
e prassi*, Laterza, 2010



T. Orlandi: “table of signs”

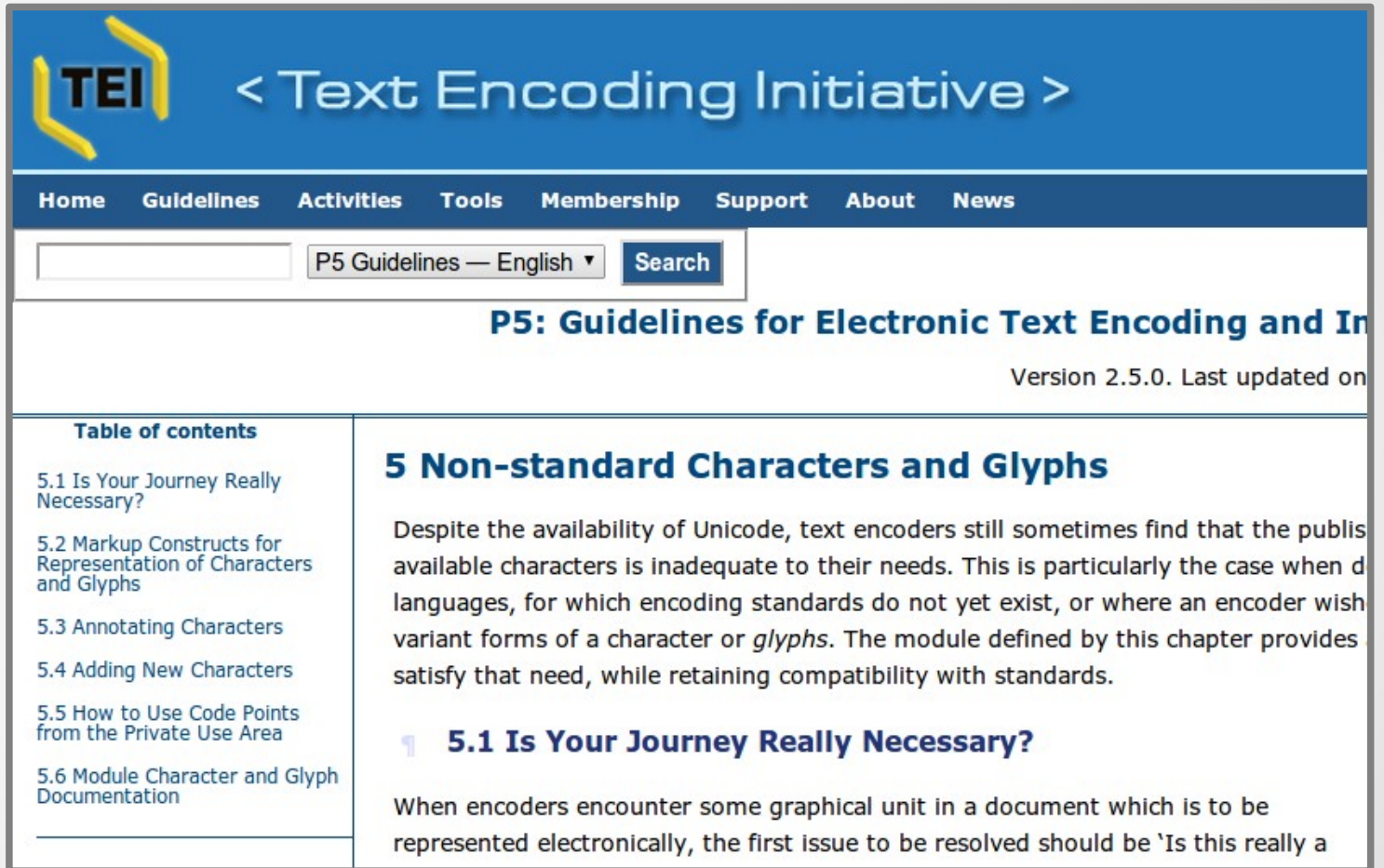
- Tito Orlandi, *Informatica testuale. Teoria e prassi*, Laterza, 2010



| Graphemes | Alphabemes | Grapheme Visualization | Type | Notes |
|-----------|------------|------------------------|------------|--------|
| a | a | a | Alphabetic | |
| b | b | b | Alphabetic | |
| c | c | c | Alphabetic | |
| d | d | d | Alphabetic | |
| e | e | e | Alphabetic | |
| æ | ae | ę | Alphabetic | An 'e' |
| f | f | f | Alphabetic | |

TEI XML → Unicode

- Unicode (a “u” is a “u”)



The screenshot shows the TEI website interface. At the top, there is a blue header with the TEI logo and the text "< Text Encoding Initiative >". Below the header is a navigation menu with links for Home, Guidelines, Activities, Tools, Membership, Support, About, and News. A search bar is present with a dropdown menu set to "P5 Guidelines — English" and a "Search" button. The main content area is titled "P5: Guidelines for Electronic Text Encoding and Interchange" with a version number of 2.5.0 and a note that it was last updated on a certain date. On the left side, there is a "Table of contents" section listing various chapters, with "5.1 Is Your Journey Really Necessary?" highlighted. The main content area displays the title "5 Non-standard Characters and Glyphs" and a paragraph explaining that despite the availability of Unicode, text encoders still sometimes find that the publicly available characters are inadequate to their needs, particularly for languages where encoding standards do not yet exist or where an encoder wishes to represent variant forms of a character or glyphs. The module defined by this chapter provides a way to satisfy that need while retaining compatibility with standards. Below this, the sub-section "5.1 Is Your Journey Really Necessary?" is introduced, followed by a paragraph stating that when encoders encounter some graphical unit in a document which is to be represented electronically, the first issue to be resolved should be 'Is this really a

TEI XML → *Unicode*

- Unicode
(a “u”
is a “u”)



**The Linked TEI:
Text Encoding in the Web**
TEI Conference and Members Meeting 2013



TEI XML → *Unicode*

- Unicode
(a “u” is a “u”)
- Corpus-wide normalization

TEI XML → *Unicode*

- Unicode
(a “u” is a “u”)
- Corpus-wide normalization
(Canterbury Tales)



TEI XML → *Unicode*

- Unicode
(a “u” is a “u”)
- Corpus-wide normalization
(Canterbury Tales)
- Documentation

2. The practice of this transcription

A specially designed computer screen font was used for the transcription.

a b c d e f g h i j k l m n o p q r s t u v w x y
A B C D E F G H I J K L M N O P Q R S T U V W X Y

These were supplemented by the following Middle English characters:

þ ȝ Ȟ ȟ

The following signs of abbreviation were available:

p, p̄ P P̄ ʳ ʳ̄ ʳ̄̄ ʳ̄̄̄ ʳ̄̄̄̄ ʳ̄̄̄̄̄ ʳ̄̄̄̄̄̄

These characters are available as superscripts:

a e i r r̄ u

Characters usually occurring at word ends are:

ȝ H h d̄

Marks of punctuation are:⁹

¶ , ; : . ()

Reforming TEI? *<charDecl>*

```
<charDecl>
```

~~a~~

~~b~~

```
<glyph id="fun-b">
```

Guide-
lines

```
<charDecl>
```

```
<char xml:id="a">
```

```
<char xml:id="b">
```

```
<glyph id="fun-b">
```

a
b
fun-b
c
d
...

Reforming TEI? *Mapping*

```
<charDecl>
```

~~a~~

~~b~~

```
<glyph id="fun-b">
```

Guide-
lines

```
<charDecl>
```

```
<char xml:id="v">
```

```
<charName>Premodern Latin  
uncial lowercase v</charName>
```

```
<charProp>
```

```
<localName>Expression
```

```
</localName>
```

```
<value>U+0076</value>
```

```
<localName>Content
```

```
</localName>
```

```
<value>v</value>
```

```
<charProp>
```

```
<mapping type="Unicode">v
```

```
</mapping>
```

```
<graphic url="v.jpg"/
```

```
</char>
```

```
<charDecl>
```

Reforming TEI? *No* <g>

```
<charDecl>
```

~~a~~
~~b~~

```
<glyph id="fun-b">
```

Guide-
lines

```
<charDecl>
```

```
<char xml:id="a">
```

```
<char xml:id="b">
```

```
<glyph id="fun-b">
```

```
<body>
```

a

b

```
<g ref="#fun-b">
```

Techn.

```
<body>
```

```
<g ref="#a">
```

```
<g ref="#b">
```

```
<g ref="#fun-b">
```

```
<body>
```

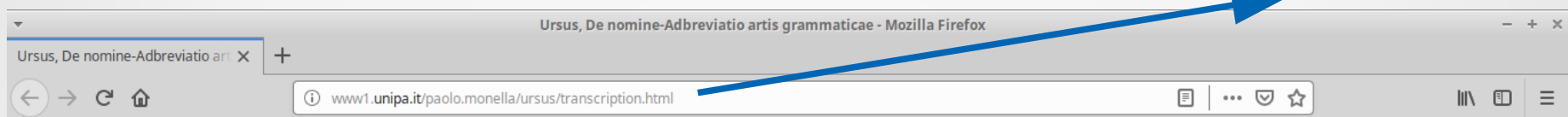
a

b

```
<g ref="#fun-b">
```

Ursus edition

<http://www.unipa.it/paolo.monella/ursus>



Ursus from Benevento, *De nomine*

From the *Abbreuiatio artis grammaticae*, codex Casanatensis 1086, ff. 1r-11r

An *experimental* scholarly digital edition of section *De nomine* (folia 1r-11r) of the *Abbreuiatio artis grammaticae* by Ursus from Benevento from codex [Casanatensis 1086](#) (IX century), edited by [Paolo Monella](#) within the [ALIM Project](#) (2017). [Click here](#) for the table of the signs (graphemes) found in the manuscript. What you see on this page is the JavaScript visualization of the XML/TEI source code. For more information on the Ursus Project, the full documentation and the source code (including XML/TEI and JavaScript), see the [project home page on GitHub](#).

Recommended browser: Mozilla Firefox. The page was also tested on Chrome.

Note: Please allow about 10 seconds for the page to load (or to reload after checking/unchecking one of the checkboxes).

- Show Alphabetic Layer (blue)
- Show Graphematic Layer (black)

Legenda

1. The black row below (*ptinet*, **Graphemic Layer**) encodes the graphemes.
2. The blue row above (*pertinet*, **Alphabetic Layer**) encodes the alphabetic letters (alphabemes) represented by those graphemes. In this case, grapheme "p" (in green) represents the three underlined alphabetic letters "p", "e" and "t".
3. The black box appearing when the user hovers a word with their mouse (*pertinet*: [*pertineo*] Verbal, II conjug, Active indicative, resent, III singular, **Linguistic Layer**) unambiguously encodes the linguistic word beyond any spelling or graphical differences, through a combination of lemma (*pertineo*) and morphology (*Verbal, II conjug, Active indicative, Present, III singular*).

prepositio
p̄positio



Start of new **folio** (hover for folio number, click to see manuscript page image). *Note: images are currently unavailable due to copyright restrictions*

GToS: Graphematic Table of Signs

| Grapheme | Alphabeme(s) | Grapheme visualization | Type | Notes | Image(s) | Found | Found where |
|----------|--------------|------------------------|------------|--|-------------------------------|-------|-------------|
| a | a | a | Alphabetic | | a.png | 1 | |
| b | b | b | Alphabetic | | b.png | 1 | |
| c | c | c | Alphabetic | | c1.png c2.png | 1 | |
| d | d | d | Alphabetic | | d.png | 1 | |
| e | e | e | Alphabetic | The grapheme has many allo-graphs depending on the ligature. For example, allograph e2.png is often found in the common ligature "&" for "et". | e1.png e2.png | 1 | |
| æ | ae | e | Alphabetic | This is an "e caudatum": an "e" grapheme with a tail on the bottom left or left side. It is often (but not always) used to represent the diphthong "ae", which is often represented by a simple "e" grapheme elsewhere in the manuscript. It has one allograph (see image ecaudatum1.png) with the tail underneath the body of the grapheme, turning right, and a second allograph (ecaudatum2.png) with the tail on the left of the body (mostly in ligatures). | ecaudatum1.png ecaudatum2.png | | 11r.a.9 |

<http://www1.unipa.it/paolo.monella/ursus/GToS.csv>

<https://github.com/paolomonella/ursus/blob/master/GToS.csv>

GToS: Graphematic Table of Signs

| <u>Grapheme</u> | <u>Alphabeme(s)</u> | <u>Grapheme visualization</u> | <u>Type</u> | <u>Notes</u> | <u>Image(s)</u> | <u>Found</u> | <u>Found Where</u> |
|-----------------|---------------------|-------------------------------|-------------------|--|-------------------------|--------------|--------------------|
| a | a | a | <u>Alphabetic</u> | | <u>a.png</u> | 1 | |
| b | b | b | <u>Alphabetic</u> | | <u>b.png</u> | 1 | |
| c | c | c | <u>Alphabetic</u> | | <u>c1.png c2.png</u> | 1 | |
| d | d | d | <u>Alphabetic</u> | | <u>d.png</u> | 1 | |
| e | e | e | <u>Alphabetic</u> | The grapheme has many allographs | <u>e1.png e2.png</u> | 1 | |
| æ | ae | e | <u>Alphabetic</u> | This is an "e caudatum": an "e" grapheme with a tail | <u>ecaudatum1.png e</u> | 1 | 1r.a.9 |
| f | f | f | <u>Alphabetic</u> | | <u>f.png</u> | 1 | |
| g | g | g | <u>Alphabetic</u> | | <u>g.png</u> | 1 | 1r.a.7 |
| h | h | h | <u>Alphabetic</u> | | <u>h.png</u> | 1 | |
| i | i | i | <u>Alphabetic</u> | | <u>i.png</u> | 1 | |
| k | k | k | <u>Alphabetic</u> | First found in 5r.a.9 when transliterating | <u>k.png</u> | 1 | 5r.a.9 |
| l | l | l | <u>Alphabetic</u> | | <u>l.png</u> | 1 | |
| m | m | m | <u>Alphabetic</u> | | <u>m.png</u> | 1 | |
| n | n | n | <u>Alphabetic</u> | | <u>n.png</u> | 1 | |
| o | o | o | <u>Alphabetic</u> | | <u>o.png</u> | 1 | |
| p | p | p | <u>Alphabetic</u> | | <u>p.png</u> | 1 | |
| q | q | q | <u>Alphabetic</u> | | <u>q.png</u> | 1 | |
| r | r | r | <u>Alphabetic</u> | | <u>r.png</u> | 1 | |

<http://www1.unipa.it/paolo.monella/ursus/GToS.csv>

<https://github.com/paolomonella/ursus/blob/master/GToS.csv>

GToS: Graphematic Table of Signs






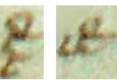
| <u>Grapheme</u> | <u>Alphabeme(s)</u> | <u>Grapheme visualization</u> | <u>Type</u> | <u>Notes</u> | <u>Image(s)</u> | <u>Found</u> | <u>Found Where</u> |
|-----------------|---------------------|-------------------------------|-------------------|--|-------------------------|--------------|--------------------|
| a | a | a | <u>Alphabetic</u> | | <u>a.png</u> | 1 | |
| b | b | b | <u>Alphabetic</u> | | <u>b.png</u> | 1 | |
| c | c | c | <u>Alphabetic</u> | | <u>c1.png c2.png</u> | 1 | |
| d | d | d | <u>Alphabetic</u> | | <u>d.png</u> | 1 | |
| e | e | e | <u>Alphabetic</u> | The grapheme has many allographs | <u>e1.png e2.png</u> | 1 | |
| æ | ae | e | <u>Alphabetic</u> | This is an "e caudatum": an "e" grapheme with a tail | <u>ecaudatum1.png e</u> | 1 | 1r.a.9 |
| f | f | f | <u>Alphabetic</u> | | <u>f.png</u> | 1 | |
| g | g | g | <u>Alphabetic</u> | | <u>g.png</u> | 1 | 1r.a.7 |
| h | h | h | <u>Alphabetic</u> | | <u>h.png</u> | 1 | |
| i | i | i | <u>Alphabetic</u> | | <u>i.png</u> | 1 | |
| k | k | k | <u>Alphabetic</u> | First found in 5r.a.9 when transliterating | <u>k.png</u> | 1 | 5r.a.9 |
| l | l | l | <u>Alphabetic</u> | | <u>l.png</u> | 1 | |
| m | m | m | <u>Alphabetic</u> | | <u>m.png</u> | 1 | |
| n | n | n | <u>Alphabetic</u> | | <u>n.png</u> | 1 | |
| o | o | o | <u>Alphabetic</u> | | <u>o.png</u> | 1 | |
| p | p | p | <u>Alphabetic</u> | | <u>p.png</u> | 1 | |
| q | q | q | <u>Alphabetic</u> | | <u>q.png</u> | 1 | |
| r | r | r | <u>Alphabetic</u> | | <u>r.png</u> | 1 | |



<http://www1.unipa.it/paolo.monella/ursus/GToS.csv>

<https://github.com/paolomonella/ursus/blob/master/GToS.csv>

GToS: *Graphematic Table of Signs*

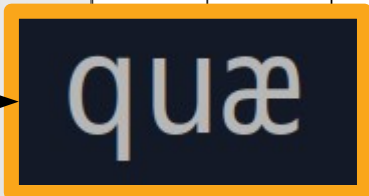
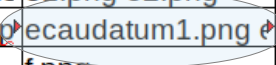
| Grapheme | Alphabeme(s) | Grapheme visualization | Type | Notes | Image(s) |
|----------|--------------|------------------------|------------|--|---|
| a | a | a | Alphabetic | |  |
| b | b | b | Alphabetic | |  |
| c | c | c | Alphabetic | |  |
| d | d | d | Alphabetic | |  |
| e | e | e | Alphabetic | The grapheme has many allographs depending on the ligature. For example, allograph e2.png is often found in the common ligature "&" for "et". |  |
| æ | ae | ę | Alphabetic | This is an "e caudatum": an "e" grapheme with a tail on the bottom left or left side. It is often (but not always) used to represent the diphthong "ae", which is often represented by a simple "e" grapheme elsewhere in the manuscript. It has one allograph (see image ecaudatum1.png) with the tail underneath the body of the grapheme, turning right, and a second allograph (ecaudatum2.png) with the tail on the left of the |  |

<http://www1.unipa.it/paolo.monella/ursus/GToS.csv>

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GToS: Graphematic Table of Signs

| <u>Grapheme</u> | <u>Alphabeme(s)</u> | <u>Grapheme visualization</u> | <u>Type</u> | <u>Notes</u> | <u>Image(s)</u> | <u>Found</u> | <u>Found Where</u> |
|-----------------|---------------------|-------------------------------|-------------------|--|-------------------------|--------------|--------------------|
| a | a | a | <u>Alphabetic</u> | | <u>a.png</u> | 1 | |
| b | b | b | <u>Alphabetic</u> | | <u>b.png</u> | 1 | |
| c | c | c | <u>Alphabetic</u> | | <u>c1.png c2.png</u> | 1 | |
| d | d | d | <u>Alphabetic</u> | | <u>d.png</u> | 1 | |
| e | e | e | <u>Alphabetic</u> | The grapheme has many allographs | <u>e1.png e2.png</u> | 1 | |
| æ | ae | e | <u>Alphabetic</u> | This is an "e caudatum": an "e" grapheme with a tail | <u>ecaudatum1.png e</u> | 1 | 1r.a.9 |
| f | f | f | <u>Alphabetic</u> | | <u>f.png</u> | 1 | |
| g | g | g | <u>Alphabetic</u> | | <u>g.png</u> | 1 | 1r.a.7 |
| h | h | h | <u>Alphabetic</u> | | <u>h.png</u> | 1 | |
| i | i | i | <u>Alphabetic</u> | | <u>i.png</u> | 1 | |
| k | k | k | <u>Alphabetic</u> | First found in 5r.a.9 when transliterating | <u>k.png</u> | 1 | 5r.a.9 |
| l | l | l | <u>Alphabetic</u> | | <u>l.png</u> | 1 | |
| m | m | m | <u>Alphabetic</u> | | <u>m.png</u> | 1 | |
| n | n | n | <u>Alphabetic</u> | | <u>n.png</u> | 1 | |
| o | o | o | <u>Alphabetic</u> | | <u>o.png</u> | 1 | |
| | | | <u>Alphabetic</u> | | <u>p.png</u> | 1 | |
| | | | <u>Alphabetic</u> | | <u>q.png</u> | 1 | |
| | | | <u>Alphabetic</u> | | <u>r.png</u> | 1 | |



<http://www1.unipa.it/paolo.monella/ursus/GToS.csv>

<https://github.com/paolomonella/ursus/blob/master/GToS.csv>

GToS: *Graphematic Table of Signs*

| <u>Grapheme</u> | <u>Alphabeme(s)</u> | <u>Grapheme visualization</u> | <u>Type</u> |
|-----------------|---------------------|-------------------------------|-------------------|
| a | a | a | <u>Alphabetic</u> |
| b | b | b | <u>Alphabetic</u> |
| c | c | c | <u>Alphabetic</u> |
| d | d | d | <u>Alphabetic</u> |
| e | e | e | <u>Alphabetic</u> |
| <u>æ</u> | <u>ae</u> | <u>e</u> | <u>Alphabetic</u> |
| f | f | f | <u>Alphabetic</u> |
| g | g | g | <u>Alphabetic</u> |
| h | h | h | <u>Alphabetic</u> |
| i | i | i | <u>Alphabetic</u> |

GToS: *Graphematic Table of Signs*

| <u>Grapheme</u> | <u>Alphabeme(s)</u> | <u>Grapheme visualization</u> | <u>Type</u> |
|-----------------|---------------------|-------------------------------|-------------------|
| k | k | k | <u>Alphabetic</u> |
| l | l | l | <u>Alphabetic</u> |
| m | m | m | <u>Alphabetic</u> |
| n | n | n | <u>Alphabetic</u> |
| o | o | o | <u>Alphabetic</u> |
| p | p | p | <u>Alphabetic</u> |
| q | q | q | <u>Alphabetic</u> |
| r | r | r | <u>Alphabetic</u> |
| s | s | s | <u>Alphabetic</u> |
| t | t | t | <u>Alphabetic</u> |

GToS: *Graphematic Table of Signs*

| <u>Grapheme</u> | <u>Alphabeme(s)</u> | <u>Grapheme visualization</u> | <u>Type</u> |
|-----------------|---------------------|-------------------------------|--------------------|
| u | u | u | <u>Alphabetic</u> |
| x | x | x | <u>Alphabetic</u> |
| y | y | y | <u>Alphabetic</u> |
| z | z | z | <u>Alphabetic</u> |
| | | | Space |
| . | | . | <u>Punctuation</u> |
| . | | . | <u>Punctuation</u> |
| | | , | <u>Punctuation</u> |
| ~ | | ~ | <u>Punctuation</u> |
| : | | : | <u>Punctuation</u> |

GToS: *Graphematic Table of Signs*

| <u>Grapheme</u> | <u>Alphabeme(s)</u> | <u>Grapheme visualization</u> | <u>Type</u> |
|-----------------|---------------------|-------------------------------|--------------------------|
| ‡ | | ; | <u>Punctuation</u> |
| ¨ | | ¨ | <u>Punctuation</u> |
| ‖ | | ‖ | <u>Punctuation</u> |
| 8 | | ∘̂ | <u>Abbreviation mark</u> |
| 2 | | ∘̇ | <u>Abbreviation mark</u> |
| 7 | | ∘̆ | <u>Abbreviation mark</u> |

GToS: *Graphematic Table of Signs*

| <u>Grapheme</u> | <u>Alphabeme(s)</u> | <u>Grapheme visualization</u> | <u>Type</u> |
|-----------------|---------------------|-------------------------------|--------------------------|
| — | | ̄ | <u>Abbreviation mark</u> |
| ; | | ; | <u>Abbreviation mark</u> |
| ȳ | u | ȳ | <u>Abbreviation mark</u> |
| p | per | p | <u>Brevigraph</u> |
| ŋ | pro | p | <u>Brevigraph</u> |
| ç | qui | q | <u>Brevigraph</u> |
| ÷ | est | ÷ | <u>Logograph</u> |

GToS processing: *Grapheme visualization*

```
function graph(myString) {  
    // This function inputs a string of characters representing graphemes  
    // in the XML/TEI source file and returns a string of characters  
    // that will be used to display the graphemes in the browser  
    for (var igr = 0; igr < gtos.length; igr++) {  
        // gtos[igr][0] (value of first column of GToS.csv):  
        // character representing the grapheme in the XML/TEI file  
        // gtos[igr][1] (value of second column of GToS.csv):  
        // character representing the alphabeme  
        if (gtos[igr][0] != '' && gtos[igr][2] != '') {  
            myString = myString.replace(gtos[igr][0], gtos[igr][2]);  
        }  
    }  
    return myString;  
}
```

GToS processing: *Grapheme visualization*

```
function graph(myString) {  
  for (var igr = 0; igr < gtos.length; igr++) {  
    if (gtos[igr][0] != '' && gtos[igr][2] != '') {  
      myString = myString.replace(  
        gtos[igr][0],  
        gtos[igr][2]);  
    }  
  }  
  return myString;  
}
```


GToS processing: *Grapheme visualization*

quæ

```
function graph(myString) {  
  for (var igr = 0; igr < gtos.length; igr++) {  
    if (gtos[igr][0] != '' && gtos[igr][2] != '') {  
      myString = myString.replace(  
        gtos[igr][0],  
        gtos[igr][2]);  
    }  
  }  
  return myString;  
}
```

| Grapheme | Alphabeme(s) | Grapheme visualization | Type |
|----------|--------------|------------------------|------------|
| æ | ae | ɛ | Alphabetic |

GToS processing: *Grapheme visualization*

quæ

```
function graph(myString) {  
  for (var igr = 0; igr < gtos.length; igr++) {  
    if (gtos[igr][0] != '' && gtos[igr][2] != '') {  
      myString = myString.replace(  
        gtos[igr][0],  
        gtos[igr][2]);  
    }  
  }  
  return myString;  
}
```

| Grapheme | Alpha-beme(s) | Grapheme visualization | Type |
|----------|---------------|------------------------|------------|
| æ | ae | ɛ | Alphabetic |

GToS processing: *Grapheme visualization*

quæ

quae
que

```
function graph(myString) {  
  for (var igr = 0; igr < gtos.length; igr++) {  
    if (gtos[igr][0] != '' && gtos[igr][2] != '') {  
      myString = myString.replace(  
        gtos[igr][0],  
        gtos[igr][2]);  
    }  
  }  
  return myString;  
}
```

| Grapheme | Alphabeme(s) | Grapheme visualization | Type |
|----------|--------------|------------------------|------------|
| æ | ae | ɛ | Alphabetic |

GToS processing: *Alphabeme derivation*

```
function alph(myString) {
  // This function inputs a string of characters representing graphemes
  // (myString) and returns a string of characters representing alphabemes,
  // mapping the graphemes to their standard alphabetical meaning as encode
  // in the first and second column of the "Graphemic Table of Signs" (GToS).
  for (var ialph = 0; ialph < gtos.length; ialph++) {
    // gtos[ialph][0] (value of first column of GToS.csv):
    // character representing the grapheme in the XML/TEI file
    // gtos[ialph][1] (value of second column of GToS.csv):
    // character representing the alphabeme
    if ( gtos[ialph][0] != ''
        && gtos[ialph][1] != ''
        && gtos[ialph][0] != gtos[ialph][1] ) {
      myString = myString.replace(gtos[ialph][0], gtos[ialph][1]);
    }
  }
  return myString;
}
```

GToS processing: *Alphabeme derivation*

```
function alph(myString) {  
  for (var ialph = 0; ialph < gtos.length; ialph++) {  
    if ( gtos[ialph][0] != ''  
        && gtos[ialph][1] != ''  
        && gtos[ialph][0] != gtos[ialph][1] ) {  
      myString = myString.replace(  
        gtos[ialph][0],  
        gtos[ialph][1]);  
    }  
  }  
  return myString;  
}
```

GToS processing: *Alphabeme derivation*

quæ

```
function alph(myString) {  
  for (var ialph = 0; ialph < gtos.length; ialph++) {  
    if ( gtos[ialph][0] != ''  
        && gtos[ialph][1] != ''  
        && gtos[ialph][0] != gtos[ialph][1] ) {  
      myString = myString.replace(  
        gtos[ialph][0],  
        gtos[ialph][1]);  
    }  
  }  
  return myString;  
}
```

| Grapheme | Alphabeme(s) | Grapheme visualization | Type |
|----------|--------------|------------------------|------------|
| æ | ae | ɛ | Alphabetic |

GToS processing: *Alphabeme derivation*

quæ

```
function alph(myString) {  
  for (var ialph = 0; ialph < gtos.length; ialph++) {  
    if ( gtos[ialph][0] != ''  
        && gtos[ialph][1] != ''  
        && gtos[ialph][0] != gtos[ialph][1] ) {  
      myString = myString.replace(  
        gtos[ialph][0],  
        gtos[ialph][1]);  
    }  
  }  
  return myString;  
}
```

| Grapheme | Alphabeme(s) | Grapheme visualization | Type |
|----------|--------------|------------------------|------------|
| æ | ae | ɛ | Alphabetic |

GToS processing: *Alphabeme derivation*

quæ

quae

quɛ

```
function alph(myString) {  
  for (var ialph = 0; ialph < gtos.length; ialph++) {  
    if ( gtos[ialph][0] != ''  
        && gtos[ialph][1] != ''  
        && gtos[ialph][0] != gtos[ialph][1] ) {  
      myString = myString.replace(  
        gtos[ialph][0],  
        gtos[ialph][1]);  
    }  
  }  
  return myString;  
}
```

| Grapheme | Alphabeme(s) | Grapheme visualization | Type |
|----------|--------------|------------------------|------------|
| æ | ae | ɛ | Alphabetic |

Abbreviations: *Alphabeme encoding*

```
<choice>
  <abbr type="superscription">
    qm<am>̄</am>
  </abbr>
  <expan>
    quoniam
  </expan>
</choice>
```



quoniam

qm̄



Abbreviations: *Alphabeme encoding*

```
<choice>  
  <abbr>qm̄ </abbr>  
  <expn>quoniam</expn>  
</choice>
```



quoniam

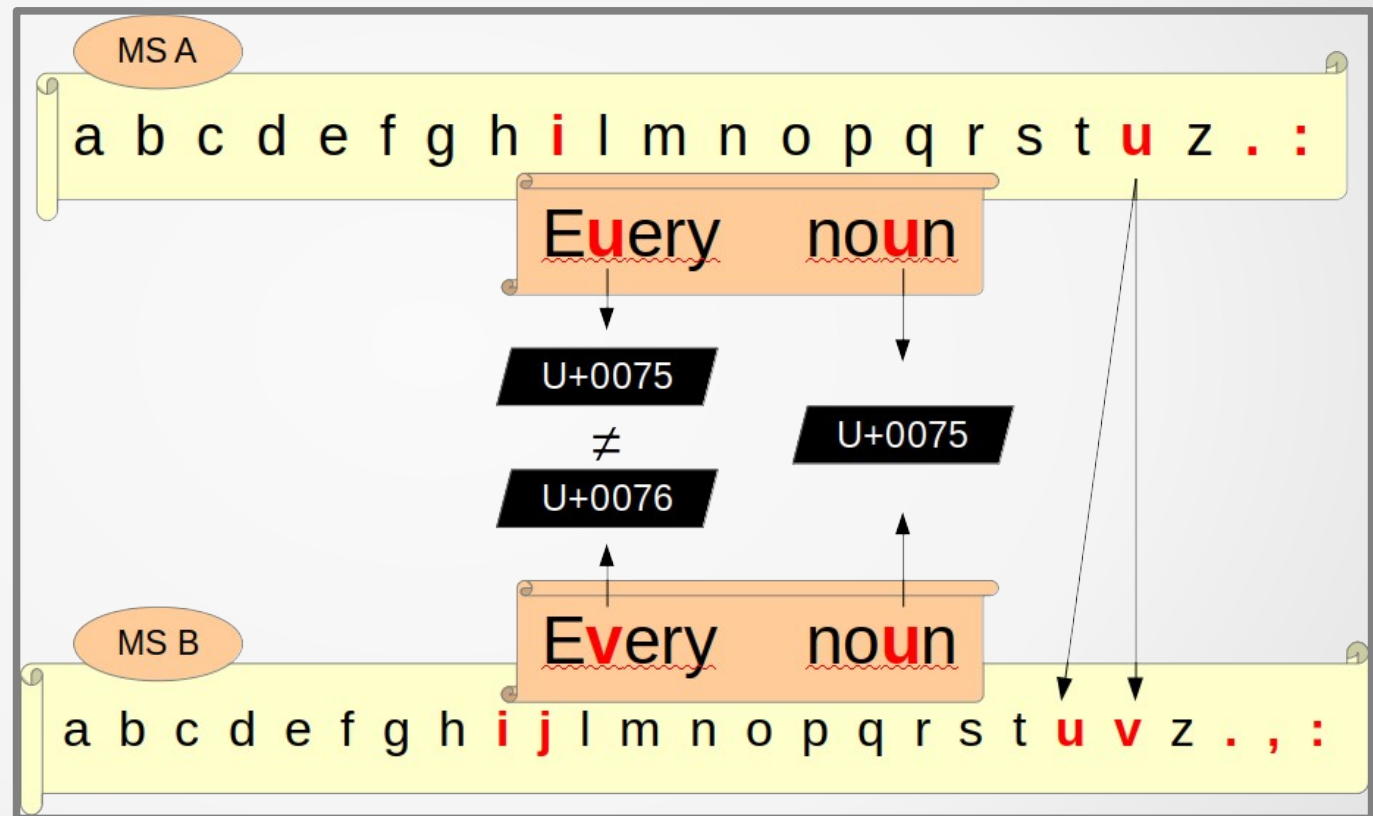
qm̄



Digital encoding of handwritten writing systems

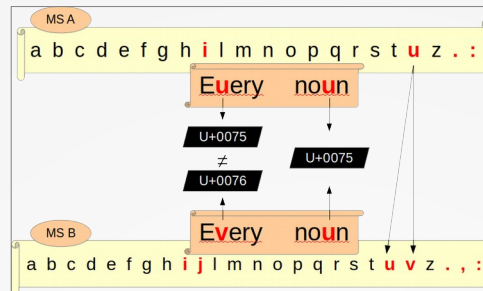
Digital encoding of handwritten writing systems

- Saussure



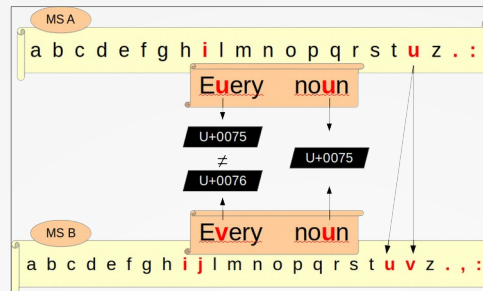
Digital encoding of handwritten writing systems

- Saussure



Digital encoding of handwritten writing systems

- Saussure

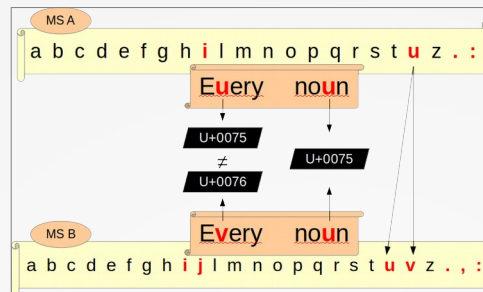


- Table of Signs

| <u>Gra- pheme</u> | <u>Alpha- beme(s)</u> | <u>Grapheme visualization</u> | <u>Type</u> | <u>Notes</u> | <u>Image(s)</u> | <u>Found</u> | <u>Found Where</u> |
|-----------------------|---------------------------|-----------------------------------|-------------------|--|---|--------------|------------------------|
| a | a | a | <u>Alphabetic</u> | | a.png | 1 | |
| b | b | b | <u>Alphabetic</u> | | b.png | 1 | |
| c | c | c | <u>Alphabetic</u> | | c1.png c2.png | 1 | |
| d | d | d | <u>Alphabetic</u> | | d.png | 1 | |
| e | e | e | <u>Alphabetic</u> | The grapheme has many allographs | e1.png e2.png | 1 | |
| æ | ae | e | <u>Alphabetic</u> | This is an "e caudatum": an "e" grapheme with a tail | e-caudatum1.png | 1 | 1r.a.9 |
| f | f | f | <u>Alphabetic</u> | | f.png | 1 | |
| g | g | g | <u>Alphabetic</u> | | g.png | 1 | 1r.a.7 |
| h | h | h | <u>Alphabetic</u> | | h.png | 1 | |
| i | i | i | <u>Alphabetic</u> | | i.png | 1 | |
| k | k | k | <u>Alphabetic</u> | First found in 5r.a.9 when transliterating | k.png | 1 | 5r.a.9 |
| l | l | l | <u>Alphabetic</u> | | l.png | 1 | |
| m | m | m | <u>Alphabetic</u> | | m.png | 1 | |
| n | n | n | <u>Alphabetic</u> | | n.png | 1 | |
| o | o | o | <u>Alphabetic</u> | | o.png | 1 | |
| p | p | p | <u>Alphabetic</u> | | p.png | 1 | |
| q | q | q | <u>Alphabetic</u> | | q.png | 1 | |
| r | r | r | <u>Alphabetic</u> | | r.png | 1 | |

Digital encoding of handwritten writing systems

- Saussure

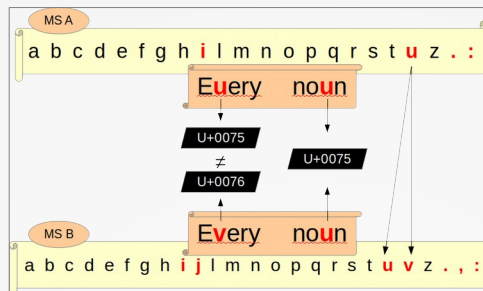


- Table of Signs

| Grapheme | Alpha-beme(s) | Grapheme visualization | Type | Notes | Image(s) | Found Where |
|----------|---------------|------------------------|------------|--|----------------|-------------|
| a | a | a | Alphabetic | | a.png | 1 |
| b | b | b | Alphabetic | | b.png | 1 |
| c | c | c | Alphabetic | | c1.png c2.png | 1 |
| d | d | d | Alphabetic | | d.png | 1 |
| e | e | e | Alphabetic | The grapheme has many allographs | e1.png e2.png | 1 |
| m | ae | e | Alphabetic | This is an "e caudatum", an "e" grapheme | ecaudatum1.png | 1, 5, a, 9 |
| f | f | f | Alphabetic | | f.png | 1 |
| g | g | g | Alphabetic | | g.png | 1, 5, a, 7 |
| h | h | h | Alphabetic | | h.png | 1 |
| i | i | i | Alphabetic | | i.png | 1 |
| k | k | k | Alphabetic | First found in 5r.a.9 when transcribed | k.png | 1, 5, a, 9 |
| l | l | l | Alphabetic | | l.png | 1 |
| m | m | m | Alphabetic | | m.png | 1 |
| n | n | n | Alphabetic | | n.png | 1 |
| o | o | o | Alphabetic | | o.png | 1 |
| p | p | p | Alphabetic | | p.png | 1 |
| q | q | q | Alphabetic | | q.png | 1 |
| r | r | r | Alphabetic | | r.png | 1 |

Digital encoding of handwritten writing systems

- Saussure



- Table of Signs

| Grapheme | Alpha-beme(s) | Grapheme visualization | Type | Notes | Image(s) | Found Where |
|----------|---------------|------------------------|------------|-------|---------------|-------------|
| a | a | a | Alphabetic | | a.png | 1 |
| b | b | b | Alphabetic | | b.png | 1 |
| c | c | c | Alphabetic | | c1.png c2.png | 1 |

- Processing

quæ

→

```
function alph(myString) {
  for (var ialph = 0; ialph < gtos.length; ialph++) {
    if ( gtos[ialph][0] != ''
      && gtos[ialph][1] != ''
      && gtos[ialph][0] != gtos[ialph][1] ) {
      myString = myString.replace(
        gtos[ialph][0],
        gtos[ialph][1]);
    }
  }
  return myString;
}
```

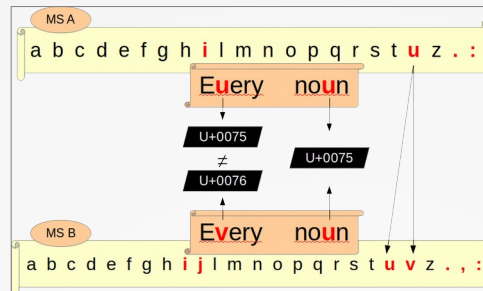
quae

↓

| Grapheme | Alpha-beme(s) | Grapheme visualization | Type |
|----------|---------------|------------------------|------------|
| æ | ae | ē | Alphabetic |

Digital encoding of handwritten writing systems

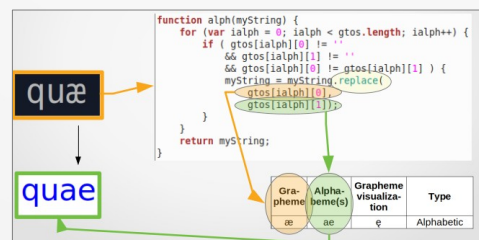
- Saussure



- Table of Signs

| Grapheme | Alpha-beme(s) | Grapheme visualization | Type | Notes | Image(s) | Found Where |
|----------|---------------|------------------------|------------|--|------------------|-------------|
| a | a | a | Alphabetic | | a.png | 1 |
| b | b | b | Alphabetic | | b.png | 1 |
| c | c | c | Alphabetic | | c1.png c2.png | 1 |
| d | d | d | Alphabetic | | d.png | 1 |
| e | e | e | Alphabetic | The grapheme has many allographs | e1.png e2.png | 1 |
| ae | ae | ae | Alphabetic | This is an "e caudatum". an "e" grapheme | ae-caudatum1.png | 1, 5r.a.9 |
| f | f | f | Alphabetic | | f.png | 1 |
| g | g | g | Alphabetic | | g.png | 1, 1r.a.7 |
| h | h | h | Alphabetic | | h.png | 1 |
| i | i | i | Alphabetic | | i.png | 1 |
| k | k | k | Alphabetic | First found in 5r.a.9 when transcribing | k.png | 1, 5r.a.9 |
| l | l | l | Alphabetic | | l.png | 1 |
| m | m | m | Alphabetic | | m.png | 1 |
| n | n | n | Alphabetic | | n.png | 1 |
| o | o | o | Alphabetic | | o.png | 1 |
| p | p | p | Alphabetic | | p.png | 1 |
| q | q | q | Alphabetic | | q.png | 1 |
| r | r | r | Alphabetic | | r.png | 1 |

- Processing



Paolo Monella

La tabella dei segni
nell'edizione scientifica digitale:
un approccio saussuriano

The table of signs
in the scholarly digital edition:
a Saussurian approach



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<http://www1.unipa.it/paolo.monella/calabriatabella2019/index.html>

Philosophy of Language and Digital Humanities

University of Calabria (Rende, CS, Italy)

Saussurian tradition session

May 8, 2019

