

# IVTFF – Intermediate Voynich MS Transcription File Format

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# 1 Purpose

## 1.1 General

This document describes a file format that allows representation of all existing ('historical') digital Voynich MS transcriptions in a consistent manner. As the word 'intermediate' suggests, this format is not intended to be the last word, but it will allow the definition of a more permanent format, ideally following accepted standards such as 'TEI'<sup>1</sup>, and allow automated machine conversion of all existing transcriptions into this permanent format. It also allows the creation of standardised tools and scripts to access all transcription files.

## 1.2 Limitations

See Section 7.

## 1.3 Change history

| Issue | Date       | Comment  |
|-------|------------|--|
| -     | (several)  | Versions earlier than 1.4 were development versions which have not been released.  |
| 1.4   | 12/08/2017 | Changes affecting the format: <ol style="list-style-type: none"><li>1. The symbol used for continuation lines has been changed from \ to /</li><li>2. The symbol used to separate alternative readings has been changed from   to :</li><li>3. The format version has been added as an optional field to the file header</li></ol> All other changes are of editorial nature.<br>This is the first released version of the format. |
| 1.5   | 23/08/2017 | Mistakes in Table 9 corrected (still had some references to   symbol)  |

## 1.4 References

[R1] <http://www.voyrich.nu/>

[R2] <http://www.voyrich.nu/transcr.html>

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<sup>1</sup> "Text Encoding Initiative", see for example <http://www.tei-c.org/index.xml>. This is only intended to highlight one option.

## 2 Definitions

**Table 1** lists the most important terms used in this document, and explains their meaning. Any text in the explanation that has been written in blue italics is a reference to another term in the same Table.

**Table 1: List of terms used in this document**

| Term               | Meaning   |
|--------------------|---|
| MS                 | The Voynich Manuscript, a codex that consists of a blank cover, paper end leaves, and parchment <i>leaves</i> . It includes text and illustrations. The vast majority of the text is written in an otherwise unknown alphabetic script. There are also a few entries in the normal (Latin) alphabet.  |
| Voynichese         | The name used here for the unknown script in the <i>MS</i> .  |
| Text block         | The complete set of parchment <i>leaves</i> of the <i>MS</i> that have been bound together.   |
| Quire              | (Also: gathering). One of the 18 sets of stacked parchment <i>sheets</i> that together form the <i>text block</i> .   |
| Bifolio            | (Also: <i>sheet</i> ). A large piece of parchment folded (usually) in the middle and bound into the <i>MS</i> . A complete <i>bifolio</i> consists of two <i>folios</i> . (There are only 2 incomplete <i>bifolios</i> in the <i>MS</i> ).  |
| Folio              | (Also: <i>leaf</i> ). A double-sided piece of parchment, usually half of a <i>bifolio</i> . The <i>folios</i> in the <i>MS</i> have been numbered 1-116 though a few are missing. All <i>folios</i> have text and/or illustrations on both sides. The ‘front’ of each <i>folio</i> is called the recto side, and the ‘back’ is called the verso side. |
| Foldout            | A <i>folio</i> that is two or more times as wide as a standard <i>folio</i> , and has been folded to fit into the <i>MS</i> .   |
| Page               | One side of a <i>folio</i> . <i>Foldout folios</i> are two or three <i>pages</i> (or panels) wide, and, depending on the layout, may have several separate <i>pages</i> on each side.   |
| Foliation          | Handwritten numbers in the corners of every <i>folio</i> , running from 1 to 116. Several numbers are skipped, as if these <i>folios</i> have been lost.  |
| MS text            | In the present format description document, the <i>MS text</i> is considered to be all text in the <i>Voynichese</i> script. Text in the Latin alphabet is not considered.  |
| Eva                | One of the conventional transcription alphabets.  |
| Page name          | An identifier of a <i>page</i> in the <i>MS</i> . It consists of the letter f, followed by the <i>folio</i> nr, followed by r or v (for recto or verso), and optionally by a number (1-3) in case it is a <i>foldout folio</i> . This is described in more detail below (Section 4.2 ).   |
| File header        | The first line of an IVTFF transcription file   |
| Page header        | A piece of text that identifies the start of a new <i>page</i> in the transcription file. It is described in more detail below.   |
| Locus              | An identifier for a unique piece of <i>MS text</i> . It is described in more detail below.  |
| Transcribed text   | A string of characters that represents a piece of <i>MS text</i> .  |
| Transcription item | A <i>locus</i> identifier followed by some <i>transcribed text</i> .  |

|                            |  |
|----------------------------|--|
| <code>&lt;space&gt;</code> | A space character (ASCII code: decimal 32 or hex. 20).   |
| Whitespace                 | A <code>&lt;space&gt;</code> , or several <code>&lt;space&gt;</code> characters in succession. |

### 3 Introduction

All historical digital Voynich MS transcriptions have been represented in plain ASCII text files, and the IVTFF format is no exception. Following is an overview of these past transcription efforts<sup>2</sup>.

**Table 2: List of historical digital transcriptions**

| Code | Transcriber(s)                               | Date         | Comment  |
|------|--|--------------|--|
| FSG  | William Friedman and his 'First Study Group' | 1946?        | This is based on a unique, dedicated transcription alphabet ('FSG')  |
| C-D  | Prescott Currier and Mary D'Imperio          | 1970's       | Using a new transcription alphabet ('Currier'). The resulting transcription is also known as 'voynich.orig'  |
| Vnow | Reeds, Gillogly, Guy (and others)            | 1990's       | Update of the C-D transcription made by members of the Reeds/Gillogly mailing list (using the 'Currier' transcription alphabet). The resulting transcription is also known as 'voynich.now'  |
| TT   | Takeshi Takahashi                            | Nov. 1998    | The first almost complete transcription of the MS using the 'Eva' alphabet. <sup>3</sup>   |
| LSI  | (Many)                                       | 1999         | A file prepared by Gabriel Landini based on efforts by Jim Reeds, containing several historical transcriptions in an interlinear manner. It was significantly update by Jorge Stolfi, so we may refer to it as the Landini-Stolfi Interlinear (LSI) file |
| LZ   | Landini and Zandbergen                       | 1999         | Two independent, complete transcriptions based on agreed rules and conventions. The intention was to merge them but this was not completed. The result has not been published.   |
| GC   | Glen Claston                                 | Early 2000's | A new transcription of the entire MS made by a single person, based on a new transcription alphabet.   |
| ZL   | Zandbergen                                   | (on-going)   | A published version of Zandbergen's part of the LZ transcription, updated to cover the complete MS. It is undergoing final verification.   |

The coverage of the text in the MS that is represented in these files has increased over time, and the file indicated as "ZL" is the first file that will be published that covers the complete MS.

<sup>2</sup> For more information about these files, see: <http://www.voynich.nu/transcr.html>

<sup>3</sup> Available at: <http://www.voynich.com/pages/>

## 4 Structure of the MS

### 4.1 General

The Voynich MS is a book or codex which is composed of parchment leaves or folios, combined into gatherings or quires<sup>4</sup>. A 'standard' quire in the MS consists of a stack of four sheets or bifolios, which is folded in the middle to form 8 folios. Each quire is sewn onto a set of three thongs, at the combined fold. A standard Voynich MS bifolio is roughly 32 cm wide and 23 cm high, meaning that a folio is roughly 23 by 16 cm.

All folios in the MS have writing and/or illustrations on both sides, and the individual sides of each folio will be referred to here as pages. Thus, a standard quire has 4 bifolios, 8 folios or 16 pages.

The quires in the Voynich MS have been numbered 1 to 20 (with 16 and 18 missing). Like many other medieval codices, several quires in the Voynich MS do not consist of the standard 8 folios. What is more unusual, though, is that several bifolios are wider than the standard size. These have additional folds and consequently more than the normal four pages. They are referred to as foldouts. These foldouts have different dimensions, with widths of the corresponding bifolios ranging from three to five pages (instead of two). In addition, there is one (approximately) 45 by 45 cm bifolio which has an additional horizontal fold.

Every folio in the MS has a folio number written on it, with the numbering running from 1 to 116, though 14 folios are missing. The corresponding folio numbers are skipped.

### 4.2 Page naming (numbering)

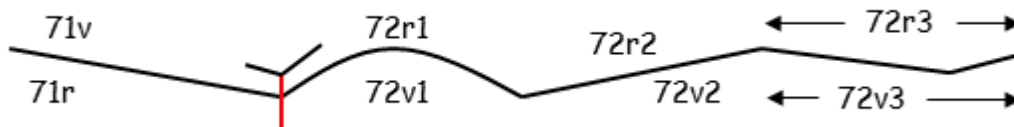
The notation used to identify a page in the Voynich MS is the character f (for folio) followed by the folio number, followed by r (for recto - the front) or v (for verso - the reverse). Thus, the first quire starts with pages: f1r, f1v, f2r, f2v, f3r, etc, and ends with f7v, f8r, f8v. The four pages: f1r, f1v, f8r and f8v together form one bifolio.

For the foldout folios, the following additional rule is applied. When any foldout is completely folded out, to the right of the binding gutter one sees the recto side of this folio. To the left is the verso side of the previous folio. If the folio nr. is  $n$ , the recto 'pages' of the foldout are numbered left to right (i.e. away from the binding):  $fnr1$ ,  $fnr2$ , etc. On the verso side (with the binding to the right) the 'pages' are numbered right to left (again away from the binding):  $f_nv1$ ,  $f_nv2$ , ...

This is illustrated below for the single bifolio in Quire 11, where the red mark represents the binding. To its left we see the standard folio f71 and to its right the multiple foldout folio f72:

---

<sup>4</sup> This text is from <http://www.voynich.nu/descr.html>



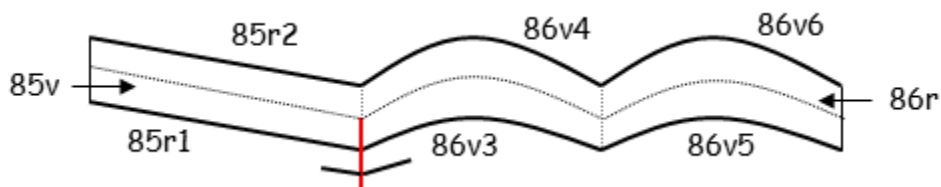
**Figure 1: page definition for folio 72 (example)**

The creases of the foldout folios sometimes form boundaries between distinct pages and sometimes do not. That is, continuous lines of writing sometimes (though rarely) cross foldout creases.

A special case is quire 14 with the pair of folios f85 and f86, which form the above-mentioned multiple-foldout with the horizontal folding crease. Beside the horizontal fold it also has two vertical creases, so the bifolio is divided into 6 panels: 3 above the horizontal crease and 3 below. Each panel has approximately the same size as a normal 'page'.

When the sheet is folded out, a single, complicated drawing is visible, which covers six panels and is usually referred to as the Rosettes page. This single drawing covers the verso side of f85 and the recto side of f86, and the page name that will be used for this is 'Ros'. The list of pages for this quire is therefore:

- f85 recto, with two pages: f85r1 and f85r2
- f85 verso + f86 recto, with one single drawing. One page: fRos
- f86 verso, with four pages: f86v4, f86v3, f86v6, f86v5



**Figure 2: Layout of quire 14 and its folios and pages**

### 4.3 Structure by illustration type

Almost all pages in the MS are illustrated. Illustrations of a similar type are mostly grouped together in the MS, while there are also a few text-only pages among them<sup>5</sup>. The following list indicates the different types of illustrations that may be found in the MS:

- Herbal or botanical, with drawings of herbs, some of which look realistic, while others appear imaginary
- Astronomical, with illustrations of Sun, Moon, stars and zodiac symbols
- Cosmological, with mostly circular drawings
- Biological or balneological, with some possibly anatomical drawings with small human (mostly feminine) figures populating systems of tubes transporting liquids

<sup>5</sup> Text summarised from <http://www.voynich.nu/descr.html>



- Pharmaceutical section, so called because it has drawings of containers, next to which various small parts of herbs (leaves, roots) have been aligned
- Marginal stars, in a section that contains over 300 short paragraphs

#### 4.4 Types of text items

The text of the MS has been written mostly in a line-by-line manner, obviously from top to bottom and from left to right<sup>6</sup>. The majority of this text is written in short paragraphs, which are often separated from each other by a somewhat larger line spacing. The text tends to have a straight left margin, and is mostly only roughly right-justified, except for the last line of each paragraph which tends to be shorter. Occasionally this last line is centred or right-justified, and also occasionally, the shorter last line is left-justified, but has an additional word in the right margin, a so-called 'title'.

The text consists of groups of characters separated by spaces, and these groups seem to form words.

In some places, single 'words' are written near elements of drawings. These have come to be called 'labels'. There are also places in the MS, for example in the cosmological section, where single words appear as elements in the overall design, but not necessarily near an identifiable object.

A number of pages have circular drawings, some with text written in normal paragraphs, but all with text that has been integrated in the drawings. Frequently, text is written along the circumference of these circles, and occasionally also along radial lines.

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<sup>6</sup> Text summarised from <http://www.voynich.nu/writing.html>

## 5 File format basics

### 5.1 High-level structure

The file is an ASCII text file of unspecified width. There is no fixed line length. The only restriction is that no line shall be wider than 2048 characters<sup>7</sup>.

The file starts with a file header, followed by any number of lines.

The file header consists of a single line that has at least 12 characters.

Each of the lines after the file header is of one of two types:

- Comment line
- Data line

Comment lines may appear almost anywhere in the file, and are recognised by a # character in the first position.

The data lines consist of a number of blocks. Each block provides the transcription of one page, and is organised as follows:

- A single page header
- A number of transcription items for this page

Every transcription item consists of:

- A locus identifier
- The complete transcribed text for this locus

### 5.2 Page header (in brief)

A page header, in its most simplified form, has the format:

*<page-name>*

Where the left caret has to be in the first position of the line, *page-name* is the page name as identified in Section 4.2, and there are no <space> characters between the carets.

### 5.3 Locus identifier (in brief)

A locus identifier, in its most simplified form, has the format:

*< page-name . number , type>*

Where the left caret has to be in the first position of the line, *page-name* is the page name as identified in Section 4.2, *number* is a number increasing from 1 for each page, and *type* is a code explained further below (see Section 6.4 ).

---

<sup>7</sup> This number is likely to be revised

## 5.4 Transcribed text (in brief)

The transcribed text for each locus is on the same line as the locus identifier.

The file format does not prescribe which transcription alphabet shall be used to represent the transcribed text. By default, any file shall use only one single transcription alphabet. This alphabet is defined in the file header (see Section 6.1).

A number of characters in the transcribed text have a special meaning. No transcription alphabet is allowed to use these characters. The special characters are listed in the following table, and have been chosen such, that they do not clash with any transcription alphabet known to me (see Table 4 below). The special meaning of each of these characters will be described in more detail below (Section 6.5).

**Table 3: list of characters with a special meaning in the transcribed text**

| Character(s)              |
|---------------------------|
| < > . , { } [ : ] @ ; ? / |

If a piece of transcribed text is considered too long to be represented on a single line, it can be wrapped to the next line, by terminating the line with a / (slash), and continuing on the next line which must also have a / (slash) in its first position, which should be followed by at least one <space> character before the transcribed text is continued.

## 5.5 Use of whitespace

Whitespace has no meaning, and is used only to improve the visual appearance of the file. Following are rules and recommendations related to the use of whitespace:

- Whitespace is expected (but not obligatory) between the locus identifier and the transcribed text.
- Whitespace is not allowed inside locus identifiers
- Whitespace should not appear among the transcribed text
- Whitespace is allowed after the transcribed text, at the end of a line
- At least one <space> should appear before a \ at the end of a line
- At least one <space> should appear after the \ at the start of a continuation line

## 5.6 Comments

The format allows three types of comments:

- Comment lines (already mentioned above)
- In-line free comments
- In-line dedicated comments

### 5.6.1 Comment lines

Comment lines may appear almost anywhere, and are recognised by:

- Obligatory # sign in the first position of the line
- Recommended (optional) whitespace following the # sign

Apart from this, any character may appear in comment lines without restriction

### 5.6.2 In-line free comments

In-line free comments may appear as part of the transcribed text, for example to annotate something.

An inline free comment starts with the character pair: <!

It is terminated by the first appearance after this of the character > which has to be on the same line.

It may include any sequence of characters, also whitespace.

### 5.6.3 In-line dedicated comments

A few in-line dedicated comments are defined, e.g. <-> and <\$> . Their meaning is explained further below (Table 10: characters defining different types of in-line comments ).

## 5.7 Example

The following pseudo-transcription text is intended to illustrate the basic layout of the IVTFF format:

```
#=IVTFF Eva- 1.4
#
<flr>
# Start of page 1
#
<flr.1,@P0> fachys.ykal.ar<!strange r>.ataiin.shol.shory.cthres.y.kor.sholdy
<flr.2,+P0> sory.ckhar.or,y.kair.chtaiin.shar.ase.cthar.cthar,dan
<flr.3,+P0> syaiir.sheky.or.ykaiin.shod.cthoary.cthes.daraiin.sy
```

## 6 File format details

The high-level file structure definition in Section 5.1 fully applies and is not repeated here.

### 6.1 File header

The file header is the first line in the file. It must have at least 12 characters, but may be longer. The first 8 characters must be the sequence `#=IVTFF` followed by one `<space>`.

The four characters after this are used to identify the transcription alphabet that is used in this file.

Following this code may be an indication of the version of the IVTFF format definition. This shall only be used from version 1.5 onwards.

For the identification of the transcription alphabet, the following cases have been pre-defined:

Table 4: List of pre-defined transcription alphabet codes

| 4-character code | Char | Description                                  |
|------------------|------|--|
| FSG-             | F    | The alphabet agreed by Friedman and his team |
| Curr             | C    | The alphabet used by Prescott Currier        |
| FGuy             | G    | The 'froggy' alphabet by Jacques Guy         |
| Eva-             | E    | Eva (either basic or extended Eva)           |
| v101             | V    | The voynich-101 alphabet by Glen Claston     |

Additional codes may be added by users.

The single-character code is intended to allow the use of several different transcription alphabets in one file. It can be used in a dedicated in-line comment as described in Table 10. This is not yet used in any transcription file.

### 6.2 Comment lines

Comment lines are recognised by:

- Obligatory `#` sign in the first position of the line
- Recommended (optional) single `<space>` character following the `#` sign

The comment line terminates at the end of the line.

Any character may appear in comment lines without restriction, and reserved characters are not interpreted. The `\` character can therefore not be used to continue a comment line. A block of comment lines needs to have a `#` in the first position of each line.

Comment lines may appear anywhere in the file, except after lines that end with a `\` character.

The first line of the file (file header) looks like a comment line, and may be interpreted or ignored by tools and scripts.

### 6.3 Page headers

A page header has the following format:

```
<page-name> <! page-vars>
```

Where *page-name* is the page name as described in Section 4.2. A complete list of page names in the order in which they must appear in any transcription file is provided in Annex 1.

The dedicated comment `<! page-vars >`, which may only appear as part of the page header, is used to set a number of one-character variables to a one-character value. For example, the following dedicated comment:

```
<! $A=1 $B=b $C=C >
```

sets variable A to 1, variable B to b and variable C to C, for the present page. All variable definitions set for a previous page are reset at the start of a new page. Variable names must be upper case characters, but their values can also be lower case or numerical.

The following variables are used in the SL, LZ and ZL transcription files:

**Table 5: List of pre-defined page variables**

| Variable | Values              | Meaning   |
|----------|---------------------|---|
| \$Q      | A – T               | Quire number, from 1 to 20. P (16) and R (18) are not used.     |
| \$P      | A – X               | Page number within quire. For the possible values, see Annex 1. |
| \$I      | (see below)         | Illustration type on this page (see below)                      |
|          | A                   | Astronomical (excluding zodiac)                                 |
|          | B                   | Biological  |
|          | C                   | Cosmological  |
|          | H                   | Herbal  |
|          | P                   | Pharmaceutical  |
|          | S                   | Marginal stars only   |
|          | T                   | Text-only page (no illustrations)                               |
|          | Z                   | Zodiac  |
| \$K      | Y                   | Has a key-like sequence. (If absent: has none)                  |
| \$L      | A, B                | Currier language of this page                                   |
| \$H      | 1, 2, 3, 4, 5, X, Z | Currier's hand used on this page                                |
| \$X      | (see below)         | Has extraneous writing. (If absent: has none)                   |

|  |   |                                      |
|--|---|--------------------------------------|
|  | C | A colour annotation                  |
|  | M | A month name                         |
|  | O | Other                                |
|  | S | A sequence of characters or numbers  |
|  | V | Various (a combination of the above) |
|  | Y | Any kind (legacy files only)         |

Additional variables may be added by users.

## 6.4 Locus identifiers

Locus identifiers have the following format:

*< page . num , code >*

Or :

*< page . num , code ; T >*

Whitespace is not allowed inside locus identifiers, but it is used in the patterns above for clarity.

The fields have the following meaning:

**Table 6: Definition of the fields in the locus identifier**

| Field name          | Explanation   |
|---------------------|---|
| <i>page</i>         | The page name, which has to match the most recent page header.  |
| <i>num</i>          | A sequence number, incrementing from 1 for each page. The highest number that presently occurs is 160.                    |
| <i>code</i>         | A 3-character code, which is a 1-character 'locator' followed by a 2-character locus type                                 |
| <i>T</i>            | An optional single-character transcriber ID. Only used in interlinear files that include several parallel transcriptions. |
|                     |   |
| <i>(locator)</i>    | Indication of the relative position of this locus.  |
| <i>(locus type)</i> | Upper case character followed by lower case character or number, indicating which type of text item this locus describes. |

Within the scope of the IVTFF format, the values of *num* have been defined for all loci in the MS, and a document (possibly a web page) describing this will soon be published. None of the historical transcriptions include all loci.

The preferred order to describe loci in any transcription file is defined in Section 6.6.

Following is a list of possible 'locator' values.

**Table 7: Definition of 'locator' characters**

| Character | Meaning   |
|-----------|---|
| @         | The position of this locus is unrelated to the previous item, or not easily described by one of the following. This locator is always used for the first item on each page. |
| +         | This locus is generally below the previous item. This is the most common case.  |
| *         | The locus is at the start of the line below the previous item, but at the left margin, while the previous item was not.   |
| -         | The locus is on the same line as the previous item, but across a drawing element (future extension, not yet used)   |
| =         | The locus is on the same line as the previous item, but separated by some white space.  |
| &         | Similar to = but along a circular line  |
| ~         | The same as - or =, but indicating that the vertical alignment is not good.   |

The locus type (complete type) consists of a generic type (capital letter) followed by a subtype. The valid subtypes depend on the generic type, as defined in the following table.

**Table 8: Definition of locus types**

| Generic Type | Complete Type | Meaning   |
|--------------|---------------|---|
| P            |               | Linear text in paragraphs   |
|              | P0            | Normal left-justified text  |
|              | P1            | Normal paragraph text that is significantly away from the left, typically due to a drawing, or some other text to its left. |
|              | Pb            | A free-floating set of lines in a non-standard location.  |
|              | Pc            | A roughly centred line (compared to the previous line)  |
|              | Pr            | A (roughly) right-justified line  |
|              | Pt            | A right-justified 'title' which is on the same line as the previous item  |
| L            |               | Short piece of text, a word, or a character that is anywhere on the page. Mostly these are the so-called labels             |
|              | L0            | It is not clearly near any drawing element  |
|              | La            | A label of an astronomical or cosmological drawing element, which is not a star or a zodiac element                         |



|   |    |   |
|---|----|---|
|   | Lc | A label of a container in the pharmaceutical section  |
|   | Lf | A label of a fragment of a herb in the pharmaceutical section                                     |
|   | Ln | A label of a nymph in the biological section  |
|   | Lp | A label of a large herb or plant drawing (in the herbal section)                                  |
|   | Ls | A label of a star   |
|   | Lt | A label of a tube or a tub in the biological section (essentially everything that is not a nymph) |
|   | Lx | Extraneous writing (e.g. in the margin)   |
|   | Lz | A label of a zodiac element   |
| C |    | Text along the circumference of a circle  |
|   | Ca | The text runs anti-clockwise  |
|   | Cc | The text runs clockwise   |
| R |    | Text along the radius of a circle   |
|   | Ri | The text runs outside to inside (inwards)   |
|   | Ro | The text runs inside to outside (outwards)  |

## 6.5 Transcribed text

The transcribed text comes after each locus identifier, after some optional whitespace, and includes characters of the transcription alphabet, with, in addition, any of the following special characters:

**Table 9: List of special characters in transcribed text**

| Char. | Meaning  |
|-------|--|
| /     | If this character appears, it must be the first or the last character in the line. It does not represent a voynichese character, but indicates wrapping of the transcribed text for a locus over two (or more) lines. Comment lines are not allowed between continuation lines. A line following one that ends with a / must also have a / in the first position. The / cannot appear inside brackets of the type [ ] or { } (see below) , and if it appears inside an in-line free comment ( < ! > ) , it loses its special meaning and is just a text element. |
| .     | This character represents an apparent word space in the MS text.   |
| ,     | This character represents an uncertain apparent word space in the MS text, meaning that the transcriber had doubt that a space between two characters was sufficiently wide to call it a word space.   |
| <     | If this character appears as part of the transcribed text, it is not the start of a page header or locus identifier (which must have the < in the first position in the line), but it is the start of an in-line comment. More about in-line comments may be found below this table. Every in-line comment must be closed by a > on the same line in the file. It is permitted to have several < ... > pairs on the same line.   |

|     |   |
|-----|---|
| >   | End of an in-line comment. This character is not allowed to appear unless there was a preceding <   |
| @   | Start of a representation of a high-ascii character. It must be followed by 3 digits and then a semi-colon (;). The 3 digits must read a number that is at least 128 and not greater than 255. It is permitted to have many such high-ascii codes on the same line.   |
| ;   | End of a representation of a high-ascii character. This character is not allowed to appear unless there was a preceding @ followed by three digits.   |
| {   | Start of a representation of a ligature of Voynichese characters. The ligature must be closed by a } on the same line. The only characters that are allowed to appear between { and } are valid characters of the transcription alphabet, and high-ascii characters represented as @l <sub>m</sub> n; It is permitted to have many ligatures on the same line.  |
| }   | End of a representation of a ligature. This character is not allowed to appear unless there was a preceding {   |
| [   | Start of a representation of an uncertain reading. It must be followed by a ] on the same line, which marks the end of the uncertain reading. An uncertain reading means that the transcriber is not certain which character is meant, and gives two or three options separated by colons. It is always understood that the most likely option is the first one in the list. If there are only two options, and each option is represented by a single character in the applicable transcription alphabet, it is permitted to leave out the colon . It is permitted to have many uncertain readings on the same line. |
| ]   | End of a representation of an uncertain reading. This character is not allowed to appear unless there was a preceding [   |
| :   | This character only has a special meaning if it appears inside a [ ] pair. It is used to separate the different options for the alternative readings.   |
| ?   | A single unreadable character.  |
| ??? | An unknown number of unreadable characters.   |

There are several types of comments, which are recognised by the character that immediately follows the <

**Table 10: characters defining different types of in-line comments**

| Char. | Meaning  |
|-------|--|
| !     | This is the start of a free comment. There may be any number of characters between the ! and the > that closes it. The > must be on the same line.   |
| :     | This introduces a transcription alphabet. There has to be exactly one character after this, and before the closing > . If this character is a 0, it means that the following text is in the default transcription alphabet of the file, as identified in the page header. If it is any other character, its meaning is defined in Table 4 above. This is not yet used in any transcription file, and may be considered a future extension. |
| -     | The sequence <-> means that the text is interrupted by a drawing element   |

|    |  |
|----|--|
| \$ | The sequence <\$> means that this is the end of a paragraph. This may only appear at the end of a line.  |
| ~  | The sequence <~> means that the part on the left and the part on the right are not well aligned vertically. If there is a drawing element in between, it should be written as <-><~> |

## 6.6 The order of items in the file

1. It is not mandatory for transcription files in the IVTFF format to be complete, or even to include all pages of the MS.
2. Those pages that are included in the file must be in the order defined in Annex 1.
3. It is recommended, but not obligatory, that the loci for any page are ordered according to the item *num* as part of the locus ID (see Section 6.4 ).
  - a. In historical transcription files, the order of items (loci) in the file shall be according to the order of the original transcriber, as much as possible
  - b. In new transcription files, the order should be according to ascending values of *num*.

## 6.7 Minimum conformance

Tools reading an IVTFF file shall be able to rely on a minimum conformance to the format definition, which is given by the following rules. Files not observing these are not conformant.

- The first line matches the file header definition of Section 6.1, though without restriction on the 4-character transcription alphabet code
- The first character of each line can only be one of three characters: #, < or /
- If the first character of a line is <, the line is a page header or the start of a new locus
- If the first character is / then the previous line must have ended with a /
- Page headers must have a valid page name between < and > (see Annex 1) and no whitespace
- Locus identifiers have no whitespace, refer exactly to the page in the most recent page header, have an integer number from 1 to 999 between the . and the , and a three-character item between the , and the >
- An optional transcriber ID consists of a single character after a semi-colon
- All in-line free comments <! are closed by a > on the same line in the file
- All other in-line comments consist of 3 or 4 characters, of which the first is < and the last is >
- All alternative readings [ are closed by a ] on the same line in the file
- All ligature indications { are close by a } on the same line in the file

## 7 Limitations

### 7.1 Introduction

The present format definition ‘evolved’ largely in three stages.

The earliest stage was a set of conventions used in the 1990’s by people communicating through the internet (see also Ref. [R2]). This established some of the most basic usage, such as < > to identify loci, # for full-line comments, and . to indicate a word break in the text.

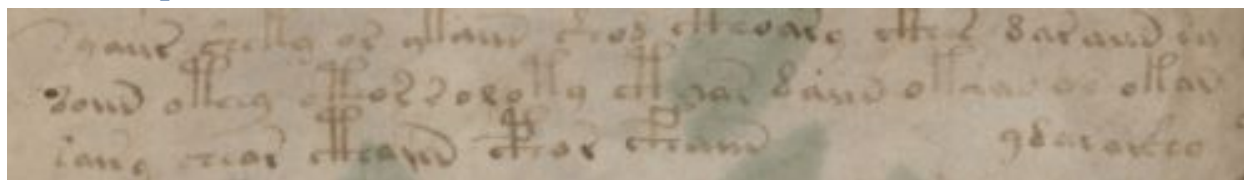
In a second stage, it was extended based on Unix-like notations such as { } for in-line comments, [ ] for alternate readings, ( ) for grouping and &...; for special characters.

In the present, third stage, many of these had to be changed in order to accommodate text in the v101 alphabet which uses many of these characters. As a result, some elements of this format definition are no longer as intuitive as they were in earlier definitions.

### 7.2 Limitations

1. In case transcription files are not complete, or the loci are not sorted in increasing order, the ‘locator’ field can be potentially misleading. In some cases it is therefore preferred to re-arrange also historical transcription files according to increasing locus order. It should be always understood that the meaning of the locator is w.r.t. the previous ‘number’, not necessarily the previous entry in the file
2. It has not always been possible to sort the loci in a completely consistent manner. This is most clearly the case in the presence of vertical lists. In some cases, the vertical arrangement appears the dominant one (e.g. on f66r), whereas in others, the horizontal alignment appears dominant (e.g. on f49v).
3. The so-called ‘interlinear placeholders’: ! and % which appear in the LSI file, clash with the v101 transcription alphabet. This means that some options should not be used with a file that uses the v101 transcription alphabet.

## 8 Examples



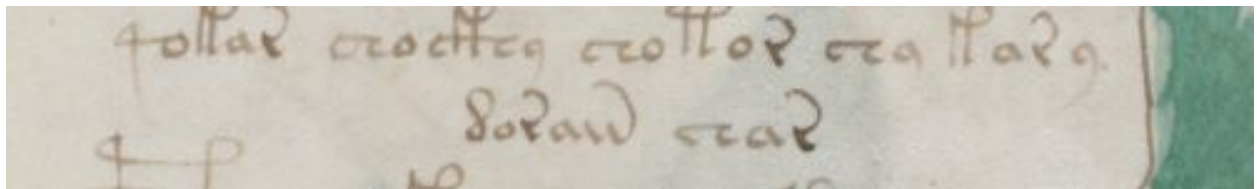
|             |  |
|-------------|--|
| <flr.3,+P0> | syair.sheky.or.ykain.shod.cthoary.cthes.darain.sy      |
| <flr.4,+P0> | soiin.oteey.oteo[s r],roloty.cthiar,dain.okain.or.okan |
| <flr.5,+P0> | sair,y.chear.cthain.cphar.cfhaiin                      |
| <flr.6,=Pt> | ydaraisly<\$>  |



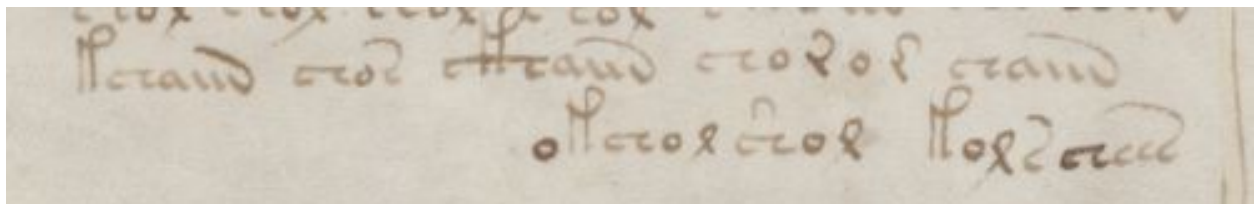
|              |   |
|--------------|---|
| <f69v.1,@Cc> | dair.cheyky.otaza.sar,ar,chykar.okoirsh,ar.chetody.<!truncated>     |
| <f69v.2,@Cc> | yka{ckh'h}.chol.ykar.dal.ykady.[i ?]okeeor.cheey.choly.<!truncated> |
| <f69v.3,@Cc> | doair.otaldal.dair.@173;.chdy.otoar.ar,{y'},chy.qoteor.<!truncated> |
| ...          |   |
| <f69v.5,@Ri> | <!10:00>okeo,dy   |
| <f69v.6,@Ri> | <!10:30>ochoyk  |
| <f69v.7,@Ri> | <!11:00>ykeey   |
| <f69v.8,@Ri> | <!11:30>ytory   |
| <f69v.9,@Ri> | <!00:00>oesy  |



|                |           |
|----------------|-----------|
| <f68r1.11,@Ls> | okoaly    |
| <f68r1.12,@Ls> | chocphy   |
| ...            |           |
| <f68r1.15,@Ls> | otydy     |
| <f68r1.16,@Ls> | okear     |
| <f68r1.17,@Ls> | cphochthy |
| ...            |           |
| <f68r1.23,@Ls> | otchdo    |



|              |                               |
|--------------|-------------------------------|
| <f42r.5,+P0> | qokar.chockhy.chotor.chy.kary |
| <f42r.6,+Pc> | dorain.char<\$>               |



|               |                                   |
|---------------|-----------------------------------|
| <f42r.22,+P0> | kchain.chos.ckhain.choro,r.chaiin |
| <f42r.23,+Pr> | okchol,shol.kolschees<\$>         |

## Annex 1: List of pages in the MS

| Quire | Page | \$Q \$P | Use in file? | Th. Petersen page nr | Comment |
|-------|------|---------|--------------|----------------------|---------|
| 1     | f1r  | A A     | Y            | 1                    |         |
| 1     | f1v  | A B     | Y            | 2                    |         |
| 1     | f2r  | A C     | Y            | 3                    |         |
| 1     | f2v  | A D     | Y            | 4                    |         |
| 1     | f3r  | A E     | Y            | 5                    |         |
| 1     | f3v  | A F     | Y            | 6                    |         |
| 1     | f4r  | A G     | Y            | 7                    |         |
| 1     | f4v  | A H     | Y            | 8                    |         |
| 1     | f5r  | A I     | Y            | 9                    |         |
| 1     | f5v  | A J     | Y            | 10                   |         |
| 1     | f6r  | A K     | Y            | 11                   |         |
| 1     | f6v  | A L     | Y            | 12                   |         |
| 1     | f7r  | A M     | Y            | 13                   |         |
| 1     | f7v  | A N     | Y            | 14                   |         |
| 1     | f8r  | A O     | Y            | 15                   |         |
| 1     | f8v  | A P     | Y            | 16                   |         |
| 2     | f9r  | B A     | Y            | 17                   |         |
| 2     | f9v  | B B     | Y            | 18                   |         |
| 2     | f10r | B C     | Y            | 19                   |         |
| 2     | f10v | B D     | Y            | 20                   |         |
| 2     | f11r | B E     | Y            | 21                   |         |
| 2     | f11v | B F     | Y            | 22                   |         |
| 2     | f13r | B G     | Y            | 23                   |         |
| 2     | f13v | B H     | Y            | 24                   |         |
| 2     | f14r | B I     | Y            | 25                   |         |
| 2     | f14v | B J     | Y            | 26                   |         |
| 2     | f15r | B K     | Y            | 27                   |         |
| 2     | f15v | B L     | Y            | 28                   |         |
| 2     | f16r | B M     | Y            | 29                   |         |
| 2     | f16v | B N     | Y            | 30                   |         |
| 3     | f17r | C A     | Y            | 31                   |         |
| 3     | f17v | C B     | Y            | 32                   |         |
| 3     | f18r | C C     | Y            | 33                   |         |

|   |      |     |   |    |  |
|---|------|-----|---|----|--|
| 3 | f18v | C D | Y | 34 |  |
| 3 | f19r | C E | Y | 35 |  |
| 3 | f19v | C F | Y | 36 |  |
| 3 | f20r | C G | Y | 37 |  |
| 3 | f20v | C H | Y | 38 |  |
| 3 | f21r | C I | Y | 39 |  |
| 3 | f21v | C J | Y | 40 |  |
| 3 | f22r | C K | Y | 41 |  |
| 3 | f22v | C L | Y | 42 |  |
| 3 | f23r | C M | Y | 43 |  |
| 3 | f23v | C N | Y | 44 |  |
| 3 | f24r | C O | Y | 45 |  |
| 3 | f24v | C P | Y | 46 |  |
| 4 | f25r | D A | Y | 47 |  |
| 4 | f25v | D B | Y | 48 |  |
| 4 | f26r | D C | Y | 49 |  |
| 4 | f26v | D D | Y | 50 |  |
| 4 | f27r | D E | Y | 51 |  |
| 4 | f27v | D F | Y | 52 |  |
| 4 | f28r | D G | Y | 53 |  |
| 4 | f28v | D H | Y | 54 |  |
| 4 | f29r | D I | Y | 55 |  |
| 4 | f29v | D J | Y | 56 |  |
| 4 | f30r | D K | Y | 57 |  |
| 4 | f30v | D L | Y | 58 |  |
| 4 | f31r | D M | Y | 59 |  |
| 4 | f31v | D N | Y | 60 |  |
| 4 | f32r | D O | Y | 61 |  |
| 4 | f32v | D P | Y | 62 |  |
| 5 | f33r | E A | Y | 63 |  |
| 5 | f33v | E B | Y | 64 |  |
| 5 | f34r | E C | Y | 65 |  |
| 5 | f34v | E D | Y | 66 |  |
| 5 | f35r | E E | Y | 67 |  |
| 5 | f35v | E F | Y | 68 |  |
| 5 | f36r | E G | Y | 69 |  |



|   |      |     |   |     |  |
|---|------|-----|---|-----|--|
| 5 | f36v | E H | Y | 70  |  |
| 5 | f37r | E I | Y | 71  |  |
| 5 | f37v | E J | Y | 72  |  |
| 5 | f38r | E K | Y | 73  |  |
| 5 | f38v | E L | Y | 74  |  |
| 5 | f39r | E M | Y | 75  |  |
| 5 | f39v | E N | Y | 76  |  |
| 5 | f40r | E O | Y | 77  |  |
| 5 | f40v | E P | Y | 78  |  |
| 6 | f41r | F A | Y | 79  |  |
| 6 | f41v | F B | Y | 80  |  |
| 6 | f42r | F C | Y | 81  |  |
| 6 | f42v | F D | Y | 82  |  |
| 6 | f43r | F E | Y | 83  |  |
| 6 | f43v | F F | Y | 84  |  |
| 6 | f44r | F G | Y | 85  |  |
| 6 | f44v | F H | Y | 86  |  |
| 6 | f45r | F I | Y | 87  |  |
| 6 | f45v | F J | Y | 88  |  |
| 6 | f46r | F K | Y | 89  |  |
| 6 | f46v | F L | Y | 90  |  |
| 6 | f47r | F M | Y | 91  |  |
| 6 | f47v | F N | Y | 92  |  |
| 6 | f48r | F O | Y | 93  |  |
| 6 | f48v | F P | Y | 94  |  |
| 7 | f49r | G A | Y | 95  |  |
| 7 | f49v | G B | Y | 96  |  |
| 7 | f50r | G C | Y | 97  |  |
| 7 | f50v | G D | Y | 98  |  |
| 7 | f51r | G E | Y | 99  |  |
| 7 | f51v | G F | Y | 100 |  |
| 7 | f52r | G G | Y | 101 |  |
| 7 | f52v | G H | Y | 102 |  |
| 7 | f53r | G I | Y | 103 |  |
| 7 | f53v | G J | Y | 104 |  |
| 7 | f54r | G K | Y | 105 |  |

|    |       |     |    |     |                         |
|----|-------|-----|----|-----|-------------------------|
| 7  | f54v  | G L | Y  | 106 |                         |
| 7  | f55r  | G M | Y  | 107 |                         |
| 7  | f55v  | G N | Y  | 108 |                         |
| 7  | f56r  | G O | Y  | 109 |                         |
| 7  | f56v  | G P | Y  | 110 |                         |
| 8  | f57r  | H A | Y  | 111 |                         |
| 8  | f57v  | H B | Y  | 112 |                         |
| 8  | f58r  | H C | Y  | 113 |                         |
| 8  | f58v  | H D | Y  | 114 |                         |
| 8  | f65r  | H E | Y  | 115 |                         |
| 8  | f65v  | H F | Y  | 116 |                         |
| 8  | f66r  | H G | Y  | 117 |                         |
| 8  | f66v  | H H | Y  | 118 |                         |
| 9  | f67r  | I A | NO |     | Placeholder for foldout |
| 9  | f67r1 | I B | Y  | 119 | Also occasionally 120   |
| 9  | f67r2 | I C | Y  | 121 |                         |
| 9  | f67v  | I D | NO |     | Placeholder for foldout |
| 9  | f67v2 | I E | Y  | 122 |                         |
| 9  | f67v1 | I F | Y  | 123 |                         |
| 9  | f68r  | I G | NO |     | Placeholder for foldout |
| 9  | f68r1 | I H | Y  | 125 |                         |
| 9  | f68r2 | I I | Y  | 126 |                         |
| 9  | f68r3 | I J | Y  | 127 |                         |
| 9  | f68v  | I K | NO |     | Placeholder for foldout |
| 9  | f68v3 | I L | Y  | 128 |                         |
| 9  | f68v2 | I M | Y  | 129 |                         |
| 9  | f68v1 | I N | Y  | 130 |                         |
| 10 | f69r  | J A | Y  | 131 |                         |
| 10 | f69v  | J B | Y  | 132 |                         |
| 10 | f70r  | J C | NO |     | Placeholder for foldout |
| 10 | f70r1 | J D | Y  | 133 |                         |
| 10 | f70r2 | J E | Y  | 134 |                         |
| 10 | f70v  | J F | NO |     | Placeholder for foldout |
| 10 | f70v2 | J G | Y  | 135 |                         |
| 10 | f70v1 | J H | Y  | 136 |                         |
| 11 | f71r  | K A | Y  | 137 |                         |

|    |       |     |    |     |                         |
|----|-------|-----|----|-----|-------------------------|
| 11 | f71v  | K B | Y  | 138 |                         |
| 11 | f72r  | K C | NO |     | Placeholder for foldout |
| 11 | f72r1 | K D | Y  | 139 |                         |
| 11 | f72r2 | K E | Y  | 140 |                         |
| 11 | f72r3 | K F | Y  | 141 |                         |
| 11 | f72v  | K G | NO |     | Placeholder for foldout |
| 11 | f72v3 | K H | Y  | 142 |                         |
| 11 | f72v2 | K I | Y  | 143 |                         |
| 11 | f72v1 | K J | Y  | 144 |                         |
| 12 | f73r  | L A | Y  | 145 |                         |
| 12 | f73v  | L B | Y  | 146 |                         |
| 13 | f75r  | M A | Y  | 147 |                         |
| 13 | f75v  | M B | Y  | 148 |                         |
| 13 | f76r  | M C | Y  | 149 |                         |
| 13 | f76v  | M D | Y  | 150 |                         |
| 13 | f77r  | M E | Y  | 151 |                         |
| 13 | f77v  | M F | Y  | 152 |                         |
| 13 | f78r  | M G | Y  | 153 |                         |
| 13 | f78v  | M H | Y  | 154 |                         |
| 13 | f79r  | M I | Y  | 155 |                         |
| 13 | f79v  | M J | Y  | 156 |                         |
| 13 | f80r  | M K | Y  | 157 |                         |
| 13 | f80v  | M L | Y  | 158 |                         |
| 13 | f81r  | M M | Y  | 159 |                         |
| 13 | f81v  | M N | Y  | 160 |                         |
| 13 | f82r  | M O | Y  | 161 |                         |
| 13 | f82v  | M P | Y  | 162 |                         |
| 13 | f83r  | M Q | Y  | 163 |                         |
| 13 | f83v  | M R | Y  | 164 |                         |
| 13 | f84r  | M S | Y  | 165 |                         |
| 13 | f84v  | M T | Y  | 166 |                         |
| 14 | f85r  | N A | NO |     | Placeholder for foldout |
| 14 | f85r1 | N B | Y  | 167 |                         |
| 14 | f85r2 | N C | Y  | 171 |                         |
| 14 | fRos  | N D | Y  |     |                         |
| 14 | f85v  | N E | NO |     | Placeholder for foldout |

|    |       |     |    |     |                                  |
|----|-------|-----|----|-----|----------------------------------|
| 14 | f85v2 | N F | NO |     | Transcribed text is part of fRos |
| 14 | f85v1 | N G | NO |     | Transcribed text is part of fRos |
| 14 | f86r  | N H | NO |     | Placeholder for foldout          |
| 14 | f86r4 | N I | NO |     | Transcribed text is part of fRos |
| 14 | f86r3 | N J | NO |     | Transcribed text is part of fRos |
| 14 | f86r6 | N K | NO |     | Transcribed text is part of fRos |
| 14 | f86r5 | N L | NO |     | Transcribed text is part of fRos |
| 14 | f86v  | N M | NO |     | Placeholder for foldout          |
| 14 | f86v4 | N N | Y  | 168 |                                  |
| 14 | f86v6 | N O | Y  | 169 |                                  |
| 14 | f86v5 | N P | Y  | 172 |                                  |
| 14 | f86v3 | N Q | Y  | 173 |                                  |
| 15 | f87r  | O A | Y  | 175 |                                  |
| 15 | f87v  | O B | Y  | 180 |                                  |
| 15 | f88r  | O C | Y  | 181 |                                  |
| 15 | f88v  | O D | Y  | 182 |                                  |
| 15 | f89r  | O E | NO |     | Placeholder for foldout          |
| 15 | f89r1 | O F | Y  | 183 |                                  |
| 15 | f89r2 | O G | Y  | 184 |                                  |
| 15 | f89v  | O H | NO |     | Placeholder for foldout          |
| 15 | f89v2 | O I | Y  | 185 |                                  |
| 15 | f89v1 | O J | Y  | 186 |                                  |
| 15 | f90r  | O K | NO |     | Placeholder for foldout          |
| 15 | f90r1 | O L | Y  | 187 |                                  |
| 15 | f90r2 | O M | Y  | 188 |                                  |
| 15 | f90v  | O N | NO |     | Placeholder for foldout          |
| 15 | f90v2 | O O | Y  | 189 |                                  |
| 15 | f90v1 | O P | Y  | 190 |                                  |
| 17 | f93r  | Q A | Y  | 191 |                                  |
| 17 | f93v  | Q B | Y  | 192 |                                  |
| 17 | f94r  | Q C | Y  | 193 |                                  |
| 17 | f94v  | Q D | Y  | 194 |                                  |
| 17 | f95r  | Q E | NO |     | Placeholder for foldout          |

|    |        |     |    |     |                                       |
|----|--------|-----|----|-----|---------------------------------------|
| 17 | f95r1  | Q F | Y  | 195 |                                       |
| 17 | f95r2  | Q G | Y  | 196 |                                       |
| 17 | f95v   | Q H | NO |     | Placeholder for foldout               |
| 17 | f95v2  | Q I | Y  | 197 |                                       |
| 17 | f95v1  | Q J | Y  | 198 |                                       |
| 17 | f96r   | Q K | Y  | 199 |                                       |
| 17 | f96v   | Q L | Y  | 200 |                                       |
| 19 | f99r   | S A | Y  | 201 |                                       |
| 19 | f99v   | S B | Y  | 202 |                                       |
| 19 | f100r  | S C | Y  | 203 |                                       |
| 19 | f100v  | S D | Y  | 204 |                                       |
| 19 | f101r  | S E | Y  | 205 |                                       |
| 19 | f101r1 | S F | NO | 205 | Transcribed text is included in f101r |
| 19 | f101r2 | S G | NO | 205 | Transcribed text is included in f101r |
| 19 | f101v  | S H | Y  |     |                                       |
| 19 | f101v2 | S I | NO | 206 | Transcribed text is included in f101v |
| 19 | f101v1 | S J | NO | 207 | Transcribed text is included in f101v |
| 19 | f102r  | S K | NO |     | Placeholder for foldout               |
| 19 | f102r1 | S L | Y  | 208 |                                       |
| 19 | f102r2 | S M | Y  | 209 |                                       |
| 19 | f102v  | S N | NO |     | Placeholder for foldout               |
| 19 | f102v2 | S O | Y  | 210 |                                       |
| 19 | f102v1 | S P | Y  | 211 |                                       |
| 20 | f103r  | T A | Y  | 212 |                                       |
| 20 | f103v  | T B | Y  | 213 |                                       |
| 20 | f104r  | T C | Y  | 214 |                                       |
| 20 | f104v  | T D | Y  | 215 |                                       |
| 20 | f105r  | T E | Y  | 216 |                                       |
| 20 | f105v  | T F | Y  | 217 |                                       |
| 20 | f106r  | T G | Y  | 218 |                                       |
| 20 | f106v  | T H | Y  | 219 |                                       |
| 20 | f107r  | T I | Y  | 220 |                                       |
| 20 | f107v  | T J | Y  | 221 |                                       |
| 20 | f108r  | T K | Y  | 222 |                                       |

|    |       |     |   |     |  |
|----|-------|-----|---|-----|--|
| 20 | f108v | T L | Y | 223 |  |
| 20 | f111r | T M | Y | 224 |  |
| 20 | f111v | T N | Y | 225 |  |
| 20 | f112r | T O | Y | 226 |  |
| 20 | f112v | T P | Y | 227 |  |
| 20 | f113r | T Q | Y | 228 |  |
| 20 | f113v | T R | Y | 229 |  |
| 20 | f114r | T S | Y | 230 |  |
| 20 | f114v | T T | Y | 231 |  |
| 20 | f115r | T U | Y | 232 |  |
| 20 | f115v | T V | Y | 233 |  |
| 20 | f116r | T W | Y | 234 |  |
| 20 | f116v | T X | Y | 235 |  |