Writings on the Wall:
A Discussion of the Voynich Manuscript
Marginalia

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1 Mission Statement

Aside of some 200 pages of text in a hitherto undeciphered writing, interspersed in the Voynich Manuscript (»VM«), there are also several instances of text which are written in latin letters.\(^1\) Unfortunately, even those latin letters are as yet not understood, and no attempt to read them has rendered a comprehensible result.

This paper attempts to give a survey of plausible, coherent readings of the marginalia, while by no means claiming to be an authoritative source, or even to be able to make any sense of it. It isn’t meant to be the last word on the issue, but rather a starting point for further (read: serious and competent) investigations regarding the marginalia.

Comments and suggestions welcome.

2 Overview

2.1 Marginalia

In the VM, marginalia can be found in the following places:

- **f1r** The bottom of the first page of the manuscript proper holds the notorious »de Tepenecz« signature. Since this writing is hardly legible and most probably not part of the original VM, it is ignored.

- **f17r** A single line of text in minuscule letter across the top of the page.

- **f49v** A sequence of digits »1« through »5« along the left margin of the page. Not exactly *latin* nor *letters*, and not open to interpretation, hence ignored.

- **f66v** On the bottom, a reclining woman, several items, a string of Voynichese words and a few short words in latin letters.

- **f70r – f74v** The »Zodiac« writings, apparently with the names of the months of the respective sign.

\(^1\)Although not all of them are written on the manuscript margins, for the sake of brevity will simply refer to all of them as »marginalia«.
Figure 1: The three VM pages with the most important marginalia (red boxes). Top: f17r, f66r, bottom: f116v.
f116v The last page of the VM has several lines of text on its top.

The »Zodiac« writings were recently the subject of an analysis by Elias Schwerdtfeger, which is included into this document here section 6. Aside of that, we will focus our attention on f17r, f66v and f116v.

2.2 Images
The sources for the images are the »Beinecke SIDs«. The images have been cropped with the IrfanView image tool, and were subsequently subjected to a contrast enhancement procedure called »Auto correction«. No other processing has been performed on them.

3 The »hands«, or scripts used in the marginalia

3.1 Observation
There are apparently no capital letters throughout the marginalia.

4 Analysis

4.0.1 Notes

1. I’ve broken up the words into »glyphs«, each glyph being (mostly) one connected sequence of penstrokes which represents one or more characters.

2. Throughout this section, letters written in san serif represent possible readings of the marginalia.

3. If some readings occur to be much more plausible than their alternatives, I’ve highlighted them with bold lettering. A very uncertain identification on the other hand is marked by a question mark »?«.

4. If several glyphs map to the same latin letter, but in different scripts, these mappings are denoted by subscript numbers. For example, $d_1$ and $d_2$ would denote two glyphs which both read »d«, but in different hands »styles« (for example, $d_1$ might be in block letters, but $d_2$ is in script).

5. An asterisk »*« denotes a single completely unreadable letter. A row of asterisks »***« indicates a presumed string of several missing characters.

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2Available from http://beinecke.library.yale.edu/digitallibrary/

3http://www.irfanview.net/

4Or one sequence which I think should be connected.
6. To designate the individual glyphs, I’ll use a simple system of Folio/word number/glyph, ie »f66r/3/4« would be the fourth glyph in the third word on f66r. I’ll omit the folio whenever the context is obvious.

7. Voynich scans are not drawn to scale.

4.1 f17r

Description: The marginal on f17r is a single line of text which runs across the top border of the page. The writing is very small, with the tallest letter not being bigger than approx. 2.5 mm.5

The text fades from left to right: Five words are clearly distinct, with the fourth already barely legible. A sixth word may follow, but this is completely unrecognizable.

4.1.1 f17r/1

The line begins with a six- or seven-letter word.

1. The first glyph might well be m, although with a very pronounced initial stroke. An initial a is unlikely, since it lacks the horizontal bottom stroke as exhibited by the next glyph. The reading nn would be possible, though that would mean that the first n lacks the initial stroke completely.6 Likewise, mi (or even im) is conceivable, but not plausible.

2. The next glyph is much darker and more distinct than the others in the word; this might well be due to it being overwritten a second time, or an emendment. It shows a distinct crescent on the left side, and a vertical stroke on the right which makes a the only probable candidate.

3. There follows the first of the glyphs with the pronounced triangular ascender, which is one of features which may help to identify the hand of the marginalia, and thus the provenance of the VM. This ascender would be used for the letters »b«, »d«, »h«, »k«, »l« and – not fully pronounced – for instances of »f« and »s«. Since this instance of the glyph consists of only the ascender and a vertical stroke, it should probably identified with l.

4. Another ascender-equipped glyph follows. It is tempting to identify it as h, but the downward stroke on the right does not descend below the baseline, while

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5Compare this to the regular text of the VM, which has already small letters at around 4 mm.
6Not to mention the fact that »nn« would be a pretty odd way to start a word.
such a descent would be characteristic for an »h«. (See 4/1, item 1) An alternative reading would be li.

5. The next glyph consists of only a single stroke, so it’s probably not an »a«, because »a« usually consists of a crescent and a separate vertical stroke. (Compare the second glyph in this word.) C, o or maybe e (with a missing component) look like possible readings.

6. The final glyph of the word consists of a vertical hook and an apparently connected dot at the right, which combine to form a »v«-like shape. This could constitute the letters r or u, or possibly v. See also f17r/2/5.

4.1.2 f17r/2

The second word consists of five glyphs.

1. The first glyph consists of a crescent, which is open to the right, and a connected straight downward stroke; the most ready interpretation is this is an a.

2. The next glyph has a top »delta«, plus a vertical stroke and nothing more – it apparently is the letter l.

3. The same for the third glyph. There is a very tiny smudge to the right on them bottom end of the vertical stroke

4. The fourth glyph looks intuitively like an »a«, but it seems to be different from the »a« represented by the first glyph – the crescent stroke is rounder and fuller here, and looks more like a semicircle than a hook. This could be intentional, but of course it could also be the consequence of the minuscule writing. If it’s not an a, I would consider ci possible.

7 »v« was only used in some of the hands appearing in the 15th century.
5. The final glyph of the word consists of a hook-shaped vertical stroke, and a dot to the right of it.\(^8\) At a first glance, it appears to be the same as the last letter of the previous word (\(f17r/1/6\); \(r\), possibly \(u\)). But close inspection shows a trace of an upward slant towards the dot at \(1/6\), which would connect both elements; this slant is almost completely missing at \(2/5\). If we assume the two elements of \(2/5\) (hook and dot) were supposed to be separate, then the first can only be an \(i\), while the second is either the i-dot, or a simple smudge.

\[
\begin{pmatrix}
a & l \\
l & a \\
_\text{ci} & u \\
_\text{i} & \\
\end{pmatrix}
\]  

\[\text{(2)}\]

4.1.3 \(f17r/3\)

The third word is composed of three glyphs.

1. The word begins with the »delta«-top-vertical-stroke glyph we have encountered before (\(1/3\), \(2/1\)). Again, interpreting it as \(l\) suggests itself. The vertical stroke is bent sideways, though, and a little speck of ink is also visible. This might point to a poorly executed \(b\), or even a badly damaged \(k\).\(^9\)

2. The second glyph is pretty distinctly a \(u\) or \(v\). It is noteworthy that the bottom arc of this letter is distinctly convex – as contrasted to the hardly visible, but seemingly more concave arcs of \(1/6\) and \(2/5\), resp. This makes an interpretation of the latter two glyphs as \(r\) more plausible than \(u\).

3. The last glyph is complex, apparently a ligature of \(cz\) with a horizontal »overbar« above it: »\(cz\)«.

Use of the overbar in medieval manuscripts: The overbar seems to have taken on various uses and hence took different names throughout the middle ages:\(^{10}\)

- As a »macron« it »usually indicates a missing \(m\) or \(n\), or a missing syllable involving one of these nasals,«\(^{11}\) while other omissions are also not unheard of: Thus »Soph\(\overline{\text{st}}\)« might expand to »Sophomore«.

\(^8\)Okay, we have said that a glyph should be a set of connected strokes. Methinks, though, it’s justified to make an exception here.
\(^9\)Like »\(v\)«, »\(k\)« wasn’t in use in all alphabets in the timeframe considered.
\(^{10}\)Use was not entirely consistent and often idiosyncratic.
\(^{11}\)http://www.ualberta.ca/~sreimer/ms-course/course/abbrevtn.htm
As a »vinculum«, on the other hand, the overbar would indicate that the designated letters should really be doubled:\(^{12}\) »Hammer« → »Hammer«.

Other uses of the overbar are –

- Indicating the length of a vowel: »Böö« → »Boot«,
- Distinguishing the letter »u« from »n« (primarily used in Germany), and
- Replacing the double-dot umlaut sign: »Nürnberg« → »Nürnberg«.

Unfortunately, none of these cases seems to be readily applicable to f17r/3.

\[
\begin{pmatrix}
1 & u \\
\hline
b & c \ast \ast \ast z
\end{pmatrix}
\]

(3)

4.1.4 f17r/4

This short letter has only the first glyph being distinct, while the other characters begin to fade away.

1. The first letter of the word has a vertical stroke, the »delta« ascender, and a crescent at the right dropping below the baseline. This seems to make the identification pretty sure to be an h. (A very weak case could be made for a severely crippled k.) Note that this shape is in contrast to the appearance of 1/4 (see item 4)

2. This letter is followed by a crescent which is open to the right and may or may not have a vertical component on the right side. This opens a number of possibilities, namely e, c, o, or a.

3. All that can be made out with any certainty of the last letter of the word is a vertical stroke which seems to have a slight hook on the top left. A small dark shade to the top right of the stroke can be seen, which might be a component of a letter. Ignoring the shade, i appears to be the best choice; if one includes the shade, u and r suggest themselves.

\(^{12}\)http://en.wikipedia.org/wiki/Scribal_abbreviation
Both here and at 1/4-5, we find the possibility of the odd letter sequence hc which rarely occurs naturally. If we let our imagination roam, it’s of course conceivable that the marginalia are simply words written backwards, rendering the much more common letter combination ch. Actually, f17r/4 could then be read ich without pushing the envelope too much, meaning in German »I«, »me«, or being an adverbial suffix akin to english »-ly«.

This is the last word on the page where at least some of the letters can be clearly made out: While the first letters are still distinct, they fade towards the right. In this word, strokes also begin to run into each other, which makes it difficult to distinguish the respective glyphs.

1. The first letter is most probably u or v. r is possible, but unlikely, due to the convex shape of the right stroke. (See also 1/6.

2. We take the second glyph to be a single, free-standing vertical stroke, and nothing more. i is apparent.

3. Two parallel vertical strokes, both slightly bent outward. In between then, a slightly diagonal horizontal stroke, which renders the appearance of a modern capital »H«. Is it an n ?

4. A vertical stroke with a very faint »delta« ascender and a »T« crossing on top. If we ignore the crossing as a smudge, l is plausible. The smudge could be a macron. (Cf. section 4.1.3)

5. Next there is a crescent, open to the right (a ?), which is connected to at least one of a sequence of about seven vertical strokes which may dissolve into any combination of i’s, m’s, and n’s. The very last character looks just like an a, if you stare at it till your eyes are bleeding.
The glyph sequence starting after $5/4$ can be read as \textit{anima}.\footnote{Interestingly, this is possible both backward and forward, keeping in line with the previously mentioned idea of backward writing. The whole word \textit{f17r/f} might in this case be something like \textit{animaliter}.}

The marginal fades from here on into various strokes and glyphs which can’t be analysed reasonably anymore.

\[
\begin{pmatrix}
u \\
v \\
i \\
i n? \\
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below the first latin marginalia letter), so this could simply be an accident or a smear on behalf of the painter.

The voynichese string reads in EVA\textsuperscript{16} –
\texttt{<otceeo daain chty ykcc?scheg>}

The mix of latin letters, Voynichese, and an illustration which resembles the »nymphs« common throughout the Voynich, make it plausible that these marginalia were part of the original manuscript, or at least drawn by the same author.

4.2.1 \texttt{f66r/1}

1. This »word« consists of a single glyph. Possible readings seem to be \textit{p, y,}\textsuperscript{17} or – with a smaller probability – \textit{r}. If one is willing to accept a Greek reading, a gamma letter »γ« would be the perfect choice. Also, the character might represent the anglo-saxon thorn letter »þ«, which was often rendered as a kind of distorted »y«.\textsuperscript{18, 19} We’ll use the symbol »ŷ« to denote the thorn for typographical reasons. See also subsubsection 4.3.1.

4.2.2 \texttt{f66r/2}

1. This word starts with a blotchy letter which was either written with too much ink on the quill, or which has been subject to later emendment. Clearly visible, there is a crescent stroke pointing upward and to the left, making the character look similar to a partial derivative sign: »∂«. In latin letters, it resembles mostly a \textit{d,}\textsuperscript{20}

2. The second letter looks pretty unambiguously like an \textit{e}.

3. The third and last letter appears to be \textit{n}.

4.2.3 \texttt{f66r/3}

1. Fairly obviously, this word starts with \textit{m}.

2. It is followed by \textit{u,} or maybe \textit{r.} (The latter choice seems improbable due to the convex shape of the upward stroke.)

\textsuperscript{16}Interestingly enough, the Takahashi transcription seems to omit the word \texttt{<dain>}

\textsuperscript{17}Again, the letter »y« was one not universally in use.

\textsuperscript{18}For instances of the use of the »þ« till within the 16th century, see
http://medievalwriting.50megs.com/scripts/examples/letter1.htm,
http://medievalwriting.50megs.com/scripts/examples/cursive4.htm, or

\textsuperscript{19}As a matter of fact, misreading »þ« as »y« has given rise to the misunderstanding of the often heard, yet still wrong phrase of »ye olde something . . . «. – Note that this reading would pretty firmly put the provenance of the manuscript somewhere on the British isles, and before the 1550s!

\textsuperscript{20}At the same time it lacks the characteristic »delta« ascender which it should have in this hand, and which the last letter of \texttt{f66r/4} does have.
3. The word’s last letter possibly has undergone emendment as well. Taken at face value, the best match is an s, or a crooked b, but it’s difficult to tell what’s underneath.

4.2.4 f66r/4

1. This word starts with an emended letter again. The emendment seems to have the same shape as 2/1, namely the derivative »µ«. Reading it as d again seems to be the natural choice. The original letter consisted at least of two vertical arcs which were open at the bottom; from the spacing of the arcs a total of three arcs (four legs) is most plausible. This would render m or, again assuming a missing initial stroke, nn. (Cf. f17r/1/1, section subsection 4.1.1.)

2. Obviously, e.

3. By the same token, l.

\[
\begin{pmatrix}
\text{p} \\
\text{y} \\
\bar{y} \\
r
\end{pmatrix} 
\] (6)

\[
\begin{pmatrix}
d_1 \\
e \\
n
\end{pmatrix} 
\] (7)

\[
\begin{pmatrix}
m \\
u \\
\text{s} \\
r \\
\end{pmatrix} 
\] (8)

\[
\begin{pmatrix}
d_1 \\
m \\
e \\
nn \\
\end{pmatrix} 
\] (9)

21 Though it would be a completely different shape from the »other d«, see item 4.
This is the first occurrence of the marginalia where they make sense – at least, somewhat, a little, in German and Dutch.

»Den« could be a German word, namely the definitive masculine accusative article (as in »give him the money«). »Mus« translates as »pulp«, »porridge«, while »mel« is »flour« (in both German and Dutch). At least, two of the three words would fit in the context of food, while the objects depicted around might be loaves of bread or bread rolls. Was the lady just eating? Is she still hungry?

A visitor to my blog suggested the third word might be »muf« – Dutch for »mouldy«. Although the third letter doesn’t really look like »f« – Rotten food as the reason for the lady’s inconvenience? Possible.

Either way, the reason for the emendation(s) remains obscure.

It has also previously been suggested the text should actually read »der Mussdel« (»The Must-Share«), supposedly a minimum inheritance required by law. I couldn’t google references for it, and it doesn’t really seem to make sense here.

4.3 f116v

Description: This is the last page of them VM, and on its top it features the longest sequence of marginalia, spanning four lines of text.

- The first line of text stands apart from the rest. Words are separated by spaces.
- In the second and third line, words are separated by »+«-signs. We accept the »+«’s as word boundaries without further ado and will include them as such in our transcription attempts.
- The fourth line begins with two Voynichese words, before it switches to Latin letters again. Words are separated by spaces again.

The Voynichese words read in EVA –
<aror sheey>

On the top left of the page, next to the marginalia, are some sketches in the style of the other manuscript illustrations. They depict –

22Cf. footnote footnote 15
23These observations would fit into circumstantial evidence from the figures hairdos and costume which would place the provenance of the Voynich manuscript in the German or Dutch lower Rhine area.
• A longish object with a heart-shaped inner part, possibly a phial or other small vessel,

• A quadruped animal with roundish snout and ears, cleft hooves and a thick tail,

• A leaning or sitting naked »nymph« with roundish hairdo.

Between the »phial« and the »lamb«, there are what appear to be three letters of marginalia. It’s pretty impossible to read them (»lab« or »las«?), but the fact that they show the »delta« ascender (which are so suspiciously absent among the Voynichese characters) seems to connect the latin marginalia again with the original production of the Voynich, rendering a later date for the marginalia unlikely. The sketches are seperated from the body of the folio by a tear in the vellum which probably already existed at the time of the drawing; it shows stitch marks where it was mended, but the sewing thread seems to have vanished in the meantime.

4.3.1 f116v/1

The first word consists of 8 glyphs. (Possibly it’s actually two words of three and five letters, resp.) These are:

1. The first letter appears to be p. The stroke below the baseline seems to »kink« as opposed to the rest of the letter, as if it was added at a later date. If the »kink« is supposed to be a part of the letter, reading as a thorn »þ« is plausible (see also subsubsection 4.2.1), otherwise the letter might be u.

2. The second letter consists of only a single, circular stroke: Nothing but o comes to mind.

3. Of the following letter little definite can be said, because it is safely blotched out. It is unclear whether this was deliberate or accidental (ie whether the letter should be included or left out of an interpretation of the text). It looks like a big x was drawn in this place; this could have been the original letter, or it could have been part of the »emendation«, ie the crossing out of the original letter.

Following this, the distance between letters seems to be slightly larger than usual. This might indicate a word seperation.

24My personal guess is this is a sheep or lamb; others have identified it as a dog, wolf, or cow.
4. The next letter exhibits the »delta« ascender plus a vertical stroke, pretty definitely l.

5. A crescent with the faintest hint of a diagonal stroke going from the top right towards the bottom left. Ignoring this stroke, it’s probably c, with the stroke it’d be e. O and a are other, weaker possibilities.

6. »Delta« ascender, a vertical stroke, plus a crescent on the right side. The immediate association is b. Assuming the crescent should have descended below the baseline, h is also conceivable.

7. Another crescent, this time with a more pronounced diagonal slash than letter item 5. Probably e, more dubiously a, c or even o.

8. The last letter of the word is faded and stained. It seems to consist of an »i« shape, plus perhaps a horizontal stroke to the right. (It is unclear if the latter is part of the stain, or part of the glyph.) l, or, including the horizontal stroke, t and r are candidates.

In general, a letter combination like »lch« seems unlikely within a word, yet there are a few German words like »Milch, »Molch« or »Strolch« (»milk«, »newt«, and »scoundrel«, respectively), that satisfy this condition.

\[\begin{array}{cccc}
p & y & o & x? \\
\hline
u & e & b & a \\
i & h & c & t \\
\end{array}\] (10)

4.3.2 f116v/2

This word is difficult to parse, because it’s quite unclear where the actual letter boundaries run. I’ve decided to split the word into three glyphs:

1. The first glyph consists of a diagonal upward\(^{25}\) slash, followed by a downward stroke to the baseline. Right to this stroke is a little curl which probably (but not 100% surely) is connected to the first stroke. Assuming there is a connection, the most plausible readings seem to be v or r. If there is no connection . . . then nothing immediately comes to mind.

\(^{25}\)assuming that the letter was written left-to-right
2. The second glyph is composed of three connected strokes forming two downward arcs. These could be read as in, ni or m with equal plausibility.

3. The third and last glyph of the word consists of a »c«-like stroke which is connected from its top to the top of the subsequent two strokes which form a downward arc. This looks to me like an or perhaps m with a very pronounced initial stroke.\(^\text{26}\)

\[
\left( \begin{array}{ccc}
\text{v} & \text{in} & \text{an} \\
\text{r} & \text{ni} & \text{m} \\
? & \text{m} & \text{m}
\end{array} \right)
\]

4.3.3 f116v/3

To the best of my estimate, this word is composed of seven glyphs. Unfortunately, there are some heavy stains over the vellum, so the reading is pretty difficult.

1. The first glyph has the same distinct shape as the first glyph of the previous word, hence my guess is it’s v or r.

2. Two strokes can be made out in the following glyph, but they don’t fit together to form a letter. One of them is a short backslash, while the other seems to be a second backslash or a vertical stroke. On the bottom, the two are connected by the tiniest of traces. o? u? Something completely different?

3. This glyph consists of a vertical and a horizontal stroke which are connected at the top left end. The vertical stroke might have a little hook pointing to the right at the bottom end. I would read t here.

4. The subsequent shape starts as the mirror image of the previous letter, but there is a little crescent-shaped stroke, open to the left, which seems to belong to the rest of the glyph. If this is correct, then the letter represented is almost surely a p or a thorn þ, with the descender below the bottom line being lost.

5. It all continues with a letter which is remarkably similar to item 3, except that the little hook at the bottom is missing. I vote for a t, though.

\(^{26}\)We will meet this peculiar shape again at the beginning of the first word on line two, see subsubsection 4.3.4.
6. The next letter looks like a model-e, complete with a diagonal crossing stroke, so I put my money here: e

7. The final glyph is composed of a horizontal and a vertical stroke, but this time they’re connected on the top right corner. A small dot is a little distance to the right of the horizontal line. If we assume the connection to the dot got lost, then r is probably the best candidate. Other than that, the first part of the glyph might be an i, but that would leave the final dot an orphan which doesn’t incorporate into the rest well.

I’m aware that my identification of letters item 3 and item 4 is quite flimsy. It is possible that the first two parts actually belong together to form a cz combination as in the last letter of subsubsection 4.1.3. It would leave the final stroke of the item 4‘th letter an orphan, though.

\[
\begin{pmatrix}
  v & o \\
  r & u & t & p & t & e & r \\
  ? & * & \hat{y} & t & e & i^* \\
\end{pmatrix}
\] (12)

4.3.4 f116v/4

The first word in the second row is composed of seven glyphs, prefixed with a »+«-sign.

1. The first letter is either an, or an m with a very pronounced initial stroke. We have encountered the same character (pair) before, see also subsubsection 4.3.2.

2. The second glyph consists of a crescent, open to the right, plus a horizontal stroke on top. At first glance, it looks like a c, but it might also be t. (Compare with the glyph number item 5)

3. The third letter looks pretty convincingly like h with the pronounced ascender and the final stroke which descends until well below the bottom line.

4. The following glyph, consisting of a horizontal and a vertical stroke connected at the top right corner looks like i. The »dot« above the »i« is fairly far away from the letter itself, though, and might well be a stain on the vellum. Without the dot, the identificaction as i is far less compelling. On the other hand, no obvious alternative comes to mind.
5. A crescent open to the right with a distinct second horizontal stroke on top of it. Looks much like t.

6. A single circle. o.

7. A single arc open on the bottom – n.27

Bringing it all together, one problem is that if the first letter is m, it doesn’t parse, because the second letter is pretty certainly not a vowel.28 Now, while »anchiton« or »anthiton« are conceivable, »mchiton« or »mthiton« are really not – which is why, despite its looks, I didn’t give m a »strong« status.

\[ \text{+} \left( \text{an} \text{c} \text{h} \text{i} \text{t} \text{o} \text{n} \right) \] (13)

4.3.5 f116v/5

This word is not separated from the previous one with a »+«-sign.

It consists of eight glyphs:

1. The word begins with a ring-like glyph. O.

2. A vertical stroke with the characteristic triangular ascender. l

3. For a discussion of this letter, see below.

4. This letter resembles the last glyph of the word, except that the top right curve of the »8« is missing. At first glance it looks like d. It’s conceivable, though, that the top right curve is simply missing – either because the quill ran dry, or because the ink flaked off. In that case, the letter should be interpreted as s or perhaps 8. If it is a d, then the shape is completely different from that on subsubsection 4.2.2.

5. For a discussion of this letter, see below.

6. A vertical stroke with triangular ascender, and a circle on the bottom to the right – looks much like b.

27I don’t want to tacitly ignore a little detail, though: Between the preceding o and the beginning of this letter, there is a tiny dash which almost, but not quite, connects the previous letter with this one. I have no idea what a contraction of »on« might be supposed to mean, nor why the dash would be necessary to complete the »o«. In other words, I have no real explanation for this tiny dash, and hence ignore it loudly.

28Theoretically it might be an e, but there is little to support that on closer inspection.
7. A crescent plus a diagonal slash – surely a?

8. The last glyph is a vertical figure »8«. This seems to be s, or it’s really 8.

Discussing the third and fifth glyph The third and fifth glyph seem to represent the same letter(s), which for the sake of simplicity we’ll denote »ℵ«. 29 ℵ consists of a crescent, which is open to the right, and a vertical stroke to the bottom line. At first glance, this looks like a, 30 but lets compare this to the last-but-one letter of the word, which looks more unambiguously like a.

The difference between ℵ and a is that in ℵ, the angle between the initial left crescent and the downstroke is very acute, almost a hook, while with a it’s much more rounded off. So, if ℵ is not the letter »a«, what is it?

To me, the most convincing explanation is that it is a ligature. it might really represent cc (with all its problems of pronouncability), or ci. The latter assumption gets some limited support by the fact that above the fifth letter in the middle of the word, one can see a small spot in the vellum, above the ℵ, which could be the dot above the i.

But I’m not convinced of that.

4.3.6 f176v/6

Again, we have a word prefixed with »+«. It’s not completely clear whether the »+« is supposed to be standalone, or whether it’s connected to the following glyphs. Since the »+« in other occurences stands out quite clearly and apparently acts as a seperate character there, we’ll treat it as one here, too.

1. The word sets out with a series of four or five arcs (depending on whether you count the initial ascender. These arcs are all connected and might form any of nn, mn or nm. While this glyph is quite faded, it yet doesn’t seem that parts of letters are missing. The tops of the arcs are all well rounded, so there is little to support the view that there is an i or u part of it.
2. Following is again the top-ascender-triangle which we have met before. Again, I seems to be the most reasonable choice for this.

3. The next glyph is composed of a crescent which is open to the right and a horizontal stroke above it. t?

4. The last-but-one glyph actually touches the previous letter, but from the shape of the penstrokes it seems unlikely that the two of them actually form a single letter; it looks more like they inadvertently happened to touch each other. This glyph consists of a ring with two short strokes branching of the the bottom left and right. O would be a natural choice for this, were it not for the diagonal strokes – these could hint to an x, or some completely different letter.

5. The last glyph shows the well-known figure »8« again. This ist most probably an s, or the digit 8.

This word has often been interpreted as multos, but upon closer inspection this can’t hold true: The first glyph is one arc short of mu, there is no upward-open arc to be seen as a u would require, and calling the last-but-one letter o has its problem as well, as we have seen.

On the other hand, a word beginning with mn or nn would be very odd, too. I’m reminded of some greek words (like amnesia), which sport mn combinations, but again this doesn’t seem to be the case here. One could employ the old trick of reading the word backwards, so we would have something ending in mn, and this could be some abbreviated word31, like »Agamemm« standing for »Agamemnon«. But again, this seems to fail because the neighboring letter quite clearly looks like l, and the letter sequence lmn would not be unheard of, but definitely odd.

4.3.7 f116v/7

This very short word begins again with »+«. Then follow two glyphs:

1. The first glyph consists of a horizontal stroke, plus a very faint crescent underneath, which is open to the right. It is tempting, but by no means certain, to assume that this is the letter t.

31The »+<«-sign may indicate the abbreviation, much as today a period shows a word has been abbreviated?
2. The second glyph is a crescent open to the right. It is slightly more curled up than a c would normally be, which makes it promising to look at it as an e. Against this interpretation speaks the lack of a horizontal stroke which would make up an e. C or a can’t be ruled out either.

This word has sometimes been read as te, which at least after all would be one recognizable word, even more so appealing because it would fit in the presumed context of other Latin words like the preceding multos and the following portas.32

\[
+ \left( \begin{array}{c}
e \\
t \\
? \\
a \\
? \\
\end{array} \right)
\]

(16)

4.3.8 f116v/8

This word is pretty much a mess. It looks like it could be two words, but since there is not »±« in between, I’ll treat it as a single word for the minute.

1. The first glyph again consists of a crescent plus a horizontal stroke on top of it, which makes it look like t.

2. The following glyph – it’s not even absolutely clear that this glyph is supposed to be separate from the previous one – looks like one or two heavily emended or corrected letters. It looks like a lying figure 8 or the infinity symbol33 »∞« with a tiny »dome« on top of the left ring, and a diagonal slash point upwards from the bottom of the right ring. Upon closer inspection, one notes a small stroke on the top right of the right ring. This means that all in all the right part of the glyph – this little stroke, the right part of the right ring and the upward diagonal – could be construed to compose the r/u/v letter shape which we’ve already encountered several times. I’ll stick to this interpretation for the moment, although it leaves me at quite a loss as to what the rest of the glyph may be supposed to mean. The division between this glyph and the subsequent letter probably indicates a word break.

32 I don’t endorse these readings for either word, but they have their followers.
33 Please, no fits of esoterics here!
3. A crescent, open to the right, with something which may be a horizontal stroke – or simply the continuation of the crescent. C or t seem to fit.

4. This appears to be followed by an e (though without the horizontal dash, so it might also be a c).

5. The well known r/u/v shape, although a small piece of the diagonal stroke is missing.

6. The last letter of the word essentially consists of a crescent open to the right – hence, c and e would be the most likely candidates. On the other hand, there is a small upward stroke on the top right which seems to fit with neither interpretation. O? A?

\[ \begin{align*}
\left( \begin{array}{cccc}
* & r & c & e \\
* & u & t & e \\
* & v & t & a \\
\end{array} \right) & + \left( \begin{array}{c}
\text{c} \\
\text{e} \\
\text{o} \\
\text{d} \\
\text{?} \\
\end{array} \right) \\
\end{align*} \] (17)

4.3.9 f116v/9

After the vexing and puzzling concatenums we have encountered in virtually every instance hitherto, this word seems to be a nice and easy-going change – it actually screams portas in your face.

Let’s look at it in detail. Followint the »+«-sign, We’ll assume the word is composed of six glyphs:

1. The first glyph consists of a downward-pointing hook with goes well below the baseline, and a crescent open to the left immediately to the right of the hook. It certainly looks very much like a p. Indeed, there are very few other possible readings, especially since the downward stroke of the hook appears very pronounced and hard to mistake. In a pinch, I’d be willing to gamble on a thorn »y« (see subsubsection 4.2.1), but this is far less compelling.

2. A ring just above the baseline – o.

3. Another hook with a little flourish to the right. Readings of this could appear as r, u or v, but context appears to dictate r in this case.
4. The crescent-to-the-right with a horizontal stroke which this time passes through the crescent rather than to sit on top of it. Still, this is easily explained as a slip of the quill, and there is nothing to indicate that this is not a t.

5. A crescent, open to the right, with a vertical downward stroke attached to it and a small horizontal flourish. Looks much like an a.

6. Finally, a fairly distinct figure »8« again – which could either be the digit 8 or more plausibly – s.

The VM has taught us time after time to be cautious and not to jump to conclusions, but even upon close examination, this word appears to be portas, pretty unambiguously. After all the previous gobbledigook it is a bit difficult to accept the possibility of one clear-cut word in a well-established language. One thing to note is that the final letter of the word is much darker than the rest. Apparently the quill has been dipped into the ink here mid-word (!).

\[
+ \left( \frac{p \circ o t a s}{y \circ u t a s} \right)
\]

(18)

4.3.10 f116v/10

The final word on this line seems to consist of a single glyph bracketed between two more »-«-signs.

1. The lucky streak we had encountered with portas seems to end here again. The glyph consists of a crescent to the right, followed by a downward arc. The crescent might be the ascender of a letter which should then be read n. Alternatively, the crescent can be read as an a, but then it is unclear what the right part of the subsequent arc is supposed to be.

We have seen single-letter words already on f66v, but on this pages this is a novum. I wouldn’t rule out that the shape to the right of the word, so frivolously identified as a »+« really is something else, but this is difficult to support: The horizontal stroke seems to be halfway between the baseline and where the horizontal bar of a »t« would run. This is a position where usually no letter strokes would run, except perhaps the horizontal stroke of an e.
\[ + \left( \frac{n}{a^*} + \right) \]  

(19)

4.3.11 f116v/11

This is the first word in the third line of text. It is composed of three glyphs.

1. The first glyph consists of a distinct quarter-arc open to the bottom right, from which a weak vertical stroke descends below the baseline. This is a strong candidate for \( s \), or maybe \( f \), if we presume the horizontal stroke flaked off.

2. All that can be made out of this glyph is a vertical stroke with the slightest hint of a horizontal initial stroke on the top left. I is what naturally comes to mind. I wouldn’t completely rule out the possibility that this glyph really connects with the previous one,\(^34\) but there seems nothing compelling.

3. The last glyph of the word looks very much like an \( x \), complete with an initial stroke which starts just below the baseline and a faint »curve« which connects the two strokes which make up the letter.

So, this word appears to be readable as well, and it seems to be \( \text{six} \). After the pretty find of a latin \textit{portas}, now an english \textit{six}? Is the VM playing fair?

I bear in mind that the letter »\text{x}« might actually represent the sound »\text{ch}« (as in Greek or Russian), and again perhaps the word needs to be read backwards. Is »\text{six}« really »\text{chis}«, being either a word ending or some abbreviation of »\text{ichthys}« or »\text{christos}«? Endless opportunities for baseless speculations...

\[ \left( \begin{array}{ccc} s \text{ i} \text{ x} \\ f \ ? \ x \end{array} \right) \]  

(20)

\(^{34}\)Anything to make these marginalia comprehensible!
The second word on this line starts with a »+«-sign again. It is followed by what I will assume are five glyphs.\textsuperscript{35}

1. The first glyph here is a little stained. Fortunately, the stains show up in bright read as opposed to the dark blue/black of the ink, so both can be easily seperated.\textsuperscript{36} This glyph consists of to archs side by side, with the opening facing the bottom. It’s pretty hard to explain it as anything else but m.

2. The second glyph shows the familiar shape of a.

3. The third character consists of a short vertical stroke with a trace of a hook at the bottom end. Likewise, a faint dash starting just to the right of the previous letter is visible. As a third component, to the far right in the projection of the hook, there is a very short vertical stroke. Under the assumption that all three components belong together and form one letter, the familiar ambiguity of r u v comes up. This interpretation rests on the assumption the the connection between the bottom hook and the far right stroke has been lost. If this is not the case, this tokens could be virtually anything.\textsuperscript{37}

4. The last-but-one glyph shows a mirrored »S«-shape. If we suppose the dot above it got lost, it’s natural to assume this is an i. But note that its shape looks different from the second letter of the previous word, which we have also deemed to represent an i.

5. The last letter of this word shows all the characteristics of an x, much like the last letter of the previous word.

\begin{equation}
\begin{pmatrix}
\text{m} & \text{a} & \text{r} \\
\text{u} & \text{v} & \text{i} \\
\text{x} & \text{***}
\end{pmatrix}
\end{equation}

\textsuperscript{35}Rest assured, our short stroke of luck with readily readable characters will vanish once more.

\textsuperscript{36}It was apparently this stain which gave rise to a number of misreadings in the past, when only low-res black-and-white of the VM images were available.

\textsuperscript{37}One very interesting fact of the marginalia to me seems that there are a lot of ambiguities and uncertainties which letter many of the shapes represent, yet all the options for even the most dubious cases appear to be minor letters. Where have the capitals gone?
This word resembles the previous word on this line to a large extent. It begins with the »+-«-sign again. Then follows:

1. Two archs side by side, open on the bottom. This glyph looks almost identical to the first glyph of the previous word – most probably.

2. The second letter seems to be a simple ring - comes to mind.

3. The third glyph consists of two elements – An almost vertical bow, open to the right, and a dot to the top right of it. It has been suggested that this is supposed to be an r (again, with parts of the letter missing), but if you compare it to the third letter of the previous word, the convex nature of the arc appears to be distinct from the straight line of the previous instance. Hence, I opt with a higher probability for or v.

4. The next letter shows the »S«-shape again, much like the penultimate letter of the previous word. It seems a good candidate.

5. The final letter shows the same shape as the final letter of the previous word. We’ll assume it’s x here as it was there.

The string of words ending in »-ix« with the »+-«-signs resembling crosses and the mention of the word »Maria« in it has led to speculation that this really was a magical chant of rhyming words.

4.3.14  f116v/14

Much as word 13 seems to mirror word 12, word 14 resembles word 11 again. Yet, let’s have a closer look. The word begins and ends with »+-«.

1. The first letter shows a ∨-shape, sheared to the bottom right. It would be natural to assume it’s v, but the left stroke shows a concave, rather than a convex shape as we have seen previously in letters assumed to be v. So, if there is anything like a consistent handwriting at work, it ought to be something different.
2. The second glyph is usually interpreted as an i, but upon closer examination there is little to warrant that. There is a very distinct and dark backslash \( \backslash \), that’s all that may be said with any certainty. There is a small dot to the top right of this letter, plus a very faint almost vertical stroke above it. Either could be construed to be the dot above the \( \backslash \), but one can discern a very similar faint stroke running right through the following letter. Whatever these \( \text{«contrails»} \) are, they don’t seem to be part of the marginalia proper.

3. The final glyph seems again to be our well-known x. On the other hand, this character shows up so often and always word-terminal, always distinct and clearly readable that I begin to suspect something’s foul here – perhaps it’s not an x after all. But I have no idea what else it might be.

\[
+ \left( \begin{array}{cc}
  * & * \\
  v & i \\
\end{array} \right) \text{x} \quad (23)
\]

4.3.15 f116v/15

This is a four-letter word prefixed with \( \backslash+\), where the two central letters are fairly difficult to read.

1. The first letter appears to be a.

2. The second glyph shows the triangle ascender and a vertical stroke. A second vertical stroke, slightly convex, is positioned to the right of it and descends down to the bottom line. The triangle seems to point to b, h or l, in the latter case the second vertical line would point to a second character.\(^{38}\)

3. This glyph really is only a vertical stroke, slightly leaning to the left. (Compare to f116v/14/2!) There could be a slight hook to the right, and the faintest of smear traces can be discerned above it. (The dot of the i? Over all, little definite can be said about it.)

4. The last letter appears again to be a, though it’s considerably larger and taller.

With the initial and final a’s, it’s difficult to make sense of this word. »Ahca«, »abia«, … all don’t look to promising to me.

\(^{38}\)I wouldn’t completely rule out that this glyph, or at least the second vertical stroke, really belong to the subsequent glyph.
This word, again preceded by an »+«, intuitively seems to read »maria«, and with the extra »+« in the middle, which could be interpreted as a cross, this is very tempting. Let’s take a closer look. Unfortunately, the whole word is fairly faint.39

1. The first letter consists of two archs with a distinct ascender. Most probably indeed m, perhaps something like an or even nn.

2. Most probably a. This seems pretty clear. There follows the word-center »+«.

3. For this glyph, I’ll treat the three following strokes as one. First of them is the mirrored S-shape which we’ve previously identified as i, followed by a dot, and the S again. The curvature of the first two strokes could combine to give u/v/r, but there really is little to substantiate that. Thus, to most probable interpretations is really ri, but one can’t rule out combinations like vi, or even m.

4. Again, most probably a.

The word ends on another »+«-sign.

39If Nick Pelling’s theory that the original marginalia were mostly overwritten with later emendments is true, then this would make sense: Because even in this faded state the original text was (seemingly) well legible – »maria« –, hence the »redactor« saw no need to repair this word.
4.3.17 f116v/17

The fourth line begins with two words in Voynichese (»oror cheey«). Note also that in this line the »+«'s between the words have disappeared again!

1. The first letter shows the familiar u/v/r-shape.

2. It’s fair enough to assume this is a again, which runs together with . .

3. . . . the ascender triangle with a vertical stroke. L?

4. We have also encountered the »8« shape before, and this should be either s or – less probably – 8.

5. The next letter consists only of a crescent, which is open to the right. It’s tempting to assume this is c. There is not a trace of a horizontal stroke, so e can probably be ruled out.

6. Unfortunately, the top of the word-final letter is smudged, so we can only see the bottom part clearly. (It also can’t be ruled out that this glyph originally had a connection to the preceding glyph, which would result in a completely different letter combination.) What can be seen is a single crescent open on the bottom – n which is missing its ascender.

\[ < \text{oror cheey} > \begin{pmatrix} r \\ v \\ a \\ l \\ s \\ c \\ n? \\ u \end{pmatrix} \] (26)

4.3.18 f116v/18

We note that this word is in shape fairly similar to its predecessor, which reminds us of the string of similar words in line 3.

1. The first glyph seems identical to the first letter of f116v/4/1 – u/v/r.

2. The next glyph shows the vertical ascender stroke/triangle, plus a stroke to the right (compare this to item 2, f116v/15), which is this time connected to the left stroke: b, maybe h.

30
3. This is one of the »hooks«, with a dot on the top right again, as we have seen on f116v/16, while here the dot might well belong to the next glyph, or simply be a smudge. Note the concave nature of the curve which seems it more likely to be r than u or v. I wouldn’t rule out i either, in case the dot above the i was dropped.

4. This curly glyph looks definitely like an e.

5. The final letter of the word could well be a y, or perhaps n with a descender dropped below the bottom line. For some vague feelings, though, I’d like to toss in an »unknown character«. It’s a gut feeling, but I think this really is something different.

4.3.19 f116v/19

We’ll treat the letters depicted in this illustration as belonging to one word, rather than two.

1. The first letter of this word is difficult to make out\(^{40}\) – All that definitely can be said is that it consists of a horizontal dash on mid-level of the letter. Above that, there is a smudge, probably a stain of a dark-yellowish/brownish hue, which may or may not be distinct form the original ink colour. To the left, a very faint vertical stroke can be discerned, with some goodwill.

The most reasonable interpretation seems to be s, perhaps f, but the horizontal stroke for that one is missing.

2. The second letter is surely an o. It’s a simple mid-sized ring; very difficult to imagine anything else here.

3. The first glyph consists of two archs, open on the bottom, with an initial descender on the left. Except for a tiny dot to the far right of the second arch, this glyph looks exactly like the subsequent one.

If we assume that the dot is not part of the glyph (but just some dirt), our best bet is m. If we assume the dot belongs there, ni appears to be a reasonable choice.

\(^{40}\)You heard that before, didn’t you?
4. The two archs pretty definitely combine to form a m (and they are clearly enough separate from the previous glyph to be a letter in their own right.

It’s not obvious if these letters are meant to form two groups or only a single one. Taken at face value, the first letters would form the word so, which in German simply means »so« (and has similar meanings in several other languages. The letters nim could mean the imperative »Take!« in German.

$$\begin{pmatrix} s \\ ? \end{pmatrix} \begin{pmatrix} m \\ m \end{pmatrix}$$

(28)

4.3.20 f116v/20

These are the final letters on the final page of the VM. We’ll treat them as belonging to three words.

1. The first »word« begins with a »c«-like shape to which is attached a hook which runs from the right side of the »c« below the bottom line to the left. It looks like a g.

2. The second glyph consists of a crescent shape and a vertical stroke. This looks very much like a a.

3. The third and final glyph of this group consists of a vertical stroke which runs down the whole height of the »line«. On the top right, there is a disconnected short horizontal stroke to the right. The first interpretation would be s.

   Between this letter and the following »word«, there is the faintest trace of a dot though at about mid-height of the letter. This just might be a remnant of a second horizontal stroke which would make this letter f.

   This interpretation has ignored a horizontal stroke, though, which runs from the right side of the the first letter up to just before the last glyph. It looks like an inadvertent glitch of the pen (or perhaps it was meant to delete the central glyph of this word?), but if we assume it as intentional, it could change the meaning of these letters completely.

   We’ll treat the penultimate word as consisting of four letters

   1. The first glyph is the familiar shape of two downward-open archs with a descender to the left. It appears to be m, especially since there are not other dots around which would allow the interpretation as ni or similar.
2. The next glyph consists of a short horizontal dash, followed at right angles by a short downward stroke. Above this letter, a tiny dot is discernible. All in all, it looks much like a i.

3. The final letter is composed of two fused characters: The first is a crescent, open to the right, while the second consists of the well-known triangular top-ascender, followed by a wavy downward stroke, which extends even below the bottom line. It is very tempting to consider this a ligature of ch.

If we stick with the German interpretation of this last page, this word could read »mich«, meaning »me« (as in »Spank me!«), or the last three letters might simply be »ich« (»I«).

1. The last »word« consists of a single circle – presumably an o. But, fitting for the obscure nature of the VM, this circle is not completely solitary, but a string of three unexplained short dashes (or perhaps four? check at the bottom left!) goes up from the left edge of the circle. It is unclear whether these dashes are simply distortions in the vellum, smudges or accidental strokes, or whether they were put there intentionally.

4.4 An observation on quill and ink on f116v

The »blackness« of the letters on the vellum vary quite strongly from much faded characters (with possibly flaked-off ink) to very readily legible letters. Presumably, this is the effect of varying amounts of ink in the quill, with the legibility getting a good boost every time the quill was dipped into the ink again.

Under this assumption, below is a »naive« transcription of f116v, »naive« in the sense that I simply wrote the first letter which comes to mind when seeing the folio, without regard to context or plausibility. This is not meant to be the correct reading, but simply to give you an idea where on the page you are.

Then, I have highlighted those letters where there was a distinct increase in darkness.

\[
\left( g \ a \ s \ f \right) \left( m \ i \ ch \right) \left( o \ ? \right) \quad (29)
\]

They look somewhat like stitches in the vellum
Admittedly, this is a very rough and improvised assessment. Nick Pelling holds the assumption that the different shades of ink came by through a process of emendations, namely the now faded letters being the original writing, while other letters which had become illegible in the meantime had been overwritten at a later point in time. These »corrections« resulted in the darker ink spots.

I see no real need to invoke this explanation; the assumption that the quill was dipped into ink at more or less regular intervals appears to suffice to me.

5 Summary

Here is an overview over my best guesses. Options in bold are ones I’m fairly sure of. Letters with a question mark »?« are (obviously) questionable choices. An asterisk »*« or a string of asterisks »***« mean one or more »completely different« letters.

5.1 f17r

\[
\begin{pmatrix}
\text{m} \\
\text{an} \\
\text{nn} \\
\text{mi} \\
\text{im}
\end{pmatrix}
\begin{pmatrix}
\text{c} & \text{r} \\
\text{h} & \text{ou} \\
\text{l} & \text{e} \\
\text{v} & \\
\text{a} & \text{i}
\end{pmatrix}
\begin{pmatrix}
\text{a} & \text{l} & \text{l} & \text{a} & \text{r} \\
\text{l} & \text{ci} & \text{i} & & \\
& & & \text{b} & \text{u} \\
& & & \text{k} & \text{v} \\
& & & \text{k} & \text{c} \ast \ast \ast \text{z}
\end{pmatrix}
\]

(30)

5.2 f66r

\[
\begin{pmatrix}
\text{p} \\
\text{y} \\
\text{r}
\end{pmatrix}
\begin{pmatrix}
\text{d}_1 & \text{e} & \text{n} \\
& \text{m} & \text{s} \\
& \text{r} & \text{b}
\end{pmatrix}
\begin{pmatrix}
\text{d}_1 \\
\text{m} \\
\text{e} \\
\text{l}
\end{pmatrix}
\]

(31)
5.3 f116v

5.3.1 Line 1

\[
\begin{pmatrix}
\text{p} & \text{y} & \text{o} & \text{x}? & \ldots & \text{l} \\
\text{u} & \text{c} & \text{e} & \text{b} & \text{a} & \text{t} \\
\text{a} & \text{c} & \text{o} & \text{h} & \text{t} & \text{r}
\end{pmatrix}
\begin{pmatrix}
\text{v} & \text{i} & \text{n} & \text{a} & \text{n} \\
\text{r} & \text{n} & \text{i} & \text{m} & \text{m} \\
\text{p} & \text{t} & \text{e} & \text{r} & \text{i}?
\end{pmatrix}
\] (32)

5.3.2 Line 2

\[
+ \left( \begin{array}{c}
\text{a} \\
\text{m} \\
\text{c} \\
\text{h} \\
\text{i} \\
\text{t} \\
\text{o} \\
\text{n}
\end{array} \right)
\begin{pmatrix}
\text{o} & \text{l} \\
\text{c} & \text{i} \\
\text{s} & \text{s} \\
\text{a} & \text{b} & \text{a} & \text{s} \\
\text{i} & \text{e} & \text{e} & \text{t} & \text{i} & \text{t} & \text{a} & \text{s} \\
\text{c} & \text{m} & \text{n} & \text{l} & \text{t} & \text{x} & \text{s} \\
\text{m} & \text{n} & \text{m}
\end{pmatrix}
+ \left( \begin{array}{c}
\text{e} \\
\text{t} \\
\text{c} \\
\text{a} \\
\text{v} \\
\text{a} \\
\text{a}
\end{array} \right)
\] (33)

5.3.3 Line 3

\[
\left( \begin{array}{c}
\text{s} \\
\text{i} \\
\text{x} \\
\text{f} \\
? \\
\end{array} \right) + \left( \begin{array}{c}
\text{r} \\
\text{a} \\
\text{u} \\
\text{v} \\
\text{x}
\end{array} \right) + \left( \begin{array}{c}
\text{m} \\
\text{a} \\
\text{v} \\
\text{i} \\
\text{x} \\
\text{x}
\end{array} \right)
+ \left( \begin{array}{c}
\text{v} \\
\text{i} \\
\text{x} \\
\text{a} \\
? \\
\end{array} \right) + \left( \begin{array}{c}
\text{a} \\
\text{h} \\
\text{i} \\
\text{a} \\
\text{a}
\end{array} \right) + \left( \begin{array}{c}
\text{m} \\
\text{v} \\
\text{i} \\
\text{a} \\
\text{n} \\
\text{a} \\
\text{a}
\end{array} \right)
+ \left( \begin{array}{c}
\text{m} \\
\text{a} \\
\text{v} \\
\text{i} \\
\text{n}
\end{array} \right)
\] (34)

5.3.4 Line 4

\[
< \text{oror cheey} > \left( \begin{array}{c}
\text{r} \\
\text{v} \\
\text{v} \\
\text{r}
\end{array} \right) \left( \begin{array}{c}
\text{s} \\
\text{l} \\
\text{c} \\
\text{n} \\
\text{y}
\end{array} \right) + \left( \begin{array}{c}
\text{u} \\
\text{b} \\
\text{u} \\
\text{e} \\
\text{y}
\end{array} \right) + \left( \begin{array}{c}
\text{i} \\
\text{o} \\
\text{m} \\
\text{a} \\
\text{c} \\
\text{h} \\
\text{m} \\
? \\
\end{array} \right)
\] (35)
6 The Names of the Months – An Essay on the Zodiac Writings in the Voynich Manuscript, by Elias Schwerdtfeger

Originally published September 1st 2009 on http://voynich.tamagothi.de/

When I began working on this paper, I deliberately omitted the zodiac labels for two reasons – first, I already had enough on my hands with the rest of the marginalia, and second and more important, I had the strange feeling that the zodiac labels were of a different kind than the rest of the marginalia. While I’m pretty much convinced that the other marginalia were composed as a part of the VM (why else would the illustrations and even the ciphertext fit in so neatly with the marginalia?), this seems not to be the case with the zodiac labels, which to me have all the appearance of a later addition.

Luckily, while I was in the midst of working on the marginalia, Elias had independently – and with us not knowing of each other’s labour – worked on his essay on the zodiac labels, which excellently complements the material I had prepared. So, with his kind permission, I here reproduce his blog article, Die Monatsnamen, translated into english.

Note that the zodiac signs equivalent to the months January (Capricorn) and February (Aquarius) are missing from the VM. — Elmar Vogt

6.1 The un-understood manuscript

When you have an unreadable book lying before you, written in an unknown language in an alien writing (oder, more aptly in the case of the Voynich manuscript: in a hitherto uncracked cipher), and when you want to read and understand this book, it’s natural to look for clues which could give you hints on the topic of this book – such hints might be useful.

Unfortunately, the Voynich manuscript doesn’t contain clues like that. The drawing of plants are alien, the seemingly astrological and cosmological diagrams are completely incomprehensible before the background of the medieval world-view, and the drawings in the biological section belong to the most puzzling things I’ve ever seen – and I’m not alone with that. In a nutshell: The illustrations are as incomprehensible as the text itself; they seem to be deciphered themselves much like the text, though in an unknown (optical) manner, or perhaps they’re complete products of the imagination.

In the view of these properties of the manuscript, it’s not surprising that several people have concluded there possibly may be no content at all. This conclusion is very comfortable and releases one of the tedious task of solving the conundrum. Of course, it has one big drawback, which makes it – unless it’s backed up with strong evidence – inadmissible: It can’t be disproven, and hence a pure matter of faith, and thus not a iota better than any other conjecture. The highly structured character of Voynichese seems to be sufficient proof for the assumption, that it’s more plausible to assume there is »real text« behind it than the opposite.
Only one statement can be made with a good degree of certainty, considering the body of research done on the »cursed manuscript«: Dealing with it promises no easy success, perhaps even none at all, but is connected with a particularly great danger of obsession and self-delusion. Who wants to venture on such treacherous ground without knowing whether there is a reachable goal at all at the end of the pursued path? It’s little wonder that established science invests little work in this topic officially, especially since it seems difficult to achieve new results which could be laid down in a publication. In the light of the assumption that the book contents probably will turn out to be hardly spectacular – perhaps it’s the notebook of a renaissance scientist, who had to hide his research and his results before the Inquisition; perhaps it’s simply a piece of esoteric mish-mash – a contemporary scientist would have to be pretty out of his mind to waste his time and resources on such a pointless topic, rather than tackling a more promising area in his career.

6.1.1 The surprising plaintext

In this situation the uninitiated will be surprised that there is legible plaintext in Latin letters present in the manuscript. These are the month names, written in the zodiac images.

The slightly darker coloring of the month names is a telltale sign that this is possibly not the text of the original author, but an emendment of a later owner. Why these emendments were made remains obscure, because the icons of the zodiac signs speak for themselves and are, despite a few graphical oddities, comprehensible to the day. Furthermore the assignment of the zodiac signs to the months of the Gregorian calendar is wrong insofar as both systems don’t match well. Actually about one third of each month which is assigned to one of the zodiac signs falls into the previous month.42

Even this apparently immediately comprehensible text cannot be understood without some kind of interpretation, and lacking deeper insight in text and meaning of the Voynich manuscript, such an interpretation must remain speculation.

6.1.2 A speculation about the month names

If these month names are not part of the design planned by the author, but have been added by a later owner, they must reflect this later owner’s conception of the purpose of the diagrams. It is possible that this hypothetical later owner was wrong. But this later owner, who we have introduced as an additional assumption, has one advantage over us, namely he was closer to the creation of the manuscripts in terms of time, and perhaps location as well. Perhaps – to make the speculation a little more daring – he even knew the author.

Consequently, his assumptions, however wrong they may be, deserve our attention. These belatedly introduced month names show that this hypothetical, later owner did not understand the zodiac in the first line as a zodiac. Rather, he seems to have

42While this is technically true, to my knowledge in the late Middle Ages and the Renaissance the 1:1 relationship of zodiac sign to calendar month was standard practice. – cv
considered it as a kind of »calendar«, with the zodiac signs serving as a disguise of the true contents. This would also explain why the zodiac doesn't make sense even for experts on medieval astrology; it simply isn't concerned with astrology, but is something completely different.

Should this prove true – it’s only very weakly supported – then this is the first indication for optical cryptography in the individual elements of the illustrations. The icons of the zodiac signs represent no astrological concept, but a calendar concept. The assumption of such an »optical cryptography« appears to be able to explain the alien character of so many illustrations.

6.1.3 Less speculation on the month names

One thing the month names could tell us in any case, namely, in which language they were written. In this manner we could achieve a small hint, in which linguistic environment the person lived, who wrote the month names in the manuscript.

Unfortunately, this turns out to be less unambiguous than we’d desire. The only sure thing is that this person used the latin alphabet, yet the language of the month names remains obscure. Partly this is due to the fact that the latin month names were adopted in all european languages with little alteration, but also partly due to the fact that orthography in Europe’s living languages at the time of the creation of the entries was poorly regulated and hence quite arbitrary. The following studies on the month names in the manuscript will render some hints – unfortunately they don’t lead to unambiguous, clear-cut results.

6.2 The month names

6.2.1 March

This is a clearly legible word, »mars«.

The slightly unorthodox writing of the initial letter »m« is remarkable. We’ll find it again in the month name of May. Other than that, the writing is a common cursive, which is, while written in a cursory manner, pretty legible.

This spelling for March could have been used in virtually every language community, hence we achieve no information about the language.
6.2.2 April

The word is pretty well legible, too: »aberil«.

We have already encountered the shapes of »r« and »a« in March. New letters are »e«, »b«, »i« and »l«. The latter three could easily be mistaken for signs of modern current writing, but »e« surprises with a slightly unique shape. It is written with two strokes, the first of which is a flat arc, while the second looks to the untrained eye almost like a diacritic on top of this arc, while in reality it forms the top arc of the minuscule »e«. The extraordinary feature is not this composition mode, but the upward flourish of the top arc. Indeed we will see this »e« in other month names again in a similar shape, so that it appears to be a feature of the handwriting, rather than the carrier of any particular content.43

»Aberil« shows up a second time:

Aside of the fact that the shape of the »e« is less distinct, and that the dot above the »i« is missing, there is little new to discover here.

One interesting feature of this spelling is the softening of »p« to »b«, and the »e« which was introduced between »b« and »r«. This points to a language which – at least in the dialects spoken in period – attempted to soften plosives which were succeeded by other consonants. On the other hand, this hypothesis is contradicted the then ending »-bre«, which is used in the four last months of the calendar years, as we will see below.

43This peculiar »e« shape does not show up elsewhere in the marginalia of the VM. – ev
6.2.3 May

The new letter showing up here is »y«. The word is completely legible, except the diacritic above the letter »y« which turns it into a »ŷ« makes one wonder. It’s questionable whether this diacritic bears any meaning, because in the second version of »may« –

– the diacritic is missing from the »y«.

The only clue we get from this spelling regarding the language is that »y« apparently was used to denote a consonantic »i«. This is not so unusual.

For the reading of the next month name, please bear in mind that the »y« in »May« here shows a stroke in the direction of writing, which is only visible as a faint line in the first example, yet definitely was drawn.

6.2.4 June

Because the »y« in this »yony« is shaped very much different. Whether it means something or not, this is the case. Together with the strange dash over the word-final »y«, which was a common abbreviation for »m« subsequent to a vowel, this writing produces a fairly strange impression of this month name. It can be pretty much ruled

44 Or perhaps this really are two different characters … ? – ev
out that the dash is supposed to be an abbreviation of the ending »-um«; a sign similar to a »√« would have been used.

One possible interpretation is that the ending »-y« used here was supposed to represent the character sequence »ij«. A consonant »i« following »n« would be fairly unlikely, unless this »n« itself was unvoiced, shaping the vowel »o« to a nasal, as is the case in modern French.

Another possible interpretation, based on the spelling of the month »August« explained below, is that it is actually a »g«, and that the month’s name actually reads »yong« or even »gong«. It is quite possible for an initial »g« which is softened to take the place of a latin »j«, but in modern romance languages a »g« preceding an »o« is never softened without the introduction of a mute »e«. But we mustn’t forget that at the time in question orthography wasn’t as strictly regulated as nowadays and that people wrote down their mother tongue as they deemed proper.

The only thing certain appears to be that the vowel »u« of the month name was turned into an »o«. This seems to point to a feature of the language and is interesting in connection with the following.

6.2.5 July

Unfortunately I don’t have a good image of this, and I wouldn’t want to interpret too much into this poor resolution. But it’s obvious that the vowel »u« has been turned into an »o« here as well.

In this old scan I read »jolliz«, maybe »iolliz«. There is no way that the initial letter here was »y«, and the sound written down here probably wasn’t a consonant »i« either, but something different.45

45I have taken the liberty to insert a better-resolution scan of July here: It is filed at Beinecke as f71v. – ev

41
6.2.6 August

This is a pretty clear name: »augst«

The interesting thing is that the [second – ev] »u« hasn’t been turned into an »o«, but has completely vanished. We don’t know whether this was a language feature, a common abbreviation or a mistake. In the light of the »e« introduced in »aberil«, which points to a breaking up of consonant clusters, I think it’s rather improbable, that »-gst« was spoken like that. The same holds true for the endings of the last months.

6.2.7 September

This is one of the month names which are hard to read. While the initial »s« is still pretty distinct, the subsequent »e« is fairly blurred and readable mostly from the context of the other month names. The »p« is distinct, but a possibly following »t« is unreadable. The »e« has turned into a flat stroke with a small hook above it, while »m« is denoted simply by a dash over the vowel. Apparently the ending has turned into »b« with a superscript »r«.

If this was the only month name, I would call it pure conjecture to assume that this word is a month name. Only from the context of the zodiac does it become apparent, that here probably ought to stand »September«. Considering the poor legibility I don’t want to start speculating, whether a »t« has been dropped from the word.

6.2.8 Oktember

Please allow me this little joke, since this month is actually indeed called –
- »octembre«, and this is well legible. Only the ending is unclear. Since »r« and »e« run together, other readings like »octembie« are possible. On the other hand, it’s sure that the »o« has turned into an »em«.

Whatever the language of the word’s writer was, apparently he called October »Oktember«. With a good probability this »mistake« occurred in analogy to the designations »September«, »November«, and »December« in a linguistic environment which was no longer aware of the Latin word for »eight«. Unfortunately this observation doesn’t rule out any language. Perhaps one may exclude the possibility that the writer spoke Latin well, because in that case his own spelling must have hurt him.

6.2.9 November

There is little to add here, the text is well legible and unambiguous, perhaps with the exception of the ending.

6.2.10 December

It is a bit hard to read, but not as hard as September. The »d« which runs together with the first »e« is more clear from context than from the vellum.

The only remarkable feature of this month name is that »m« has been dropped. »Oktember« received an »m« which is missing from »Dezeber«. But it may also mean that in cursory writing simply the dash above the »e« was forgotten.
6.3 Compilation

Whoever wants to may try to come to conclusions regarding the language from the month names – I can’t.

- mars
- aberil
- may, maŷ
- yony, yong, yonij (?)
- jolliz (?)
- augst
- sepembr, septembr (?)
- octembre
- novembre
- decebre

For the identification of the language, May, June, July and »Oktember« are of iterest. As a matter of fact, it should be possible to find linguistic documentation from the 14th, 15th or 16th century at the latest for these spellings – perhaps it is possible after all to narrow down the geographical region where this »cursed manuscript« was stored (and perhaps even created), and perhaps it is even possible to make a fitting assumption about the author’s language this way.

This may be an important first step in the decipherment of the manuscript.

7 Acknowledgments

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While I already had had the idea of writing up possible transcriptions of the margina- lia for some time, it was Dana Scott who proposed the idea on the Voynich mailing list and gave me the final nudge to actually get going.

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