

Zaima Styling Use Cases & CSS Limitation Exploration

intended audience: W3C reviewers familiar with the [Ruby Markup](#) and the [CSS Ruby Layout Module Level 1](#) who can suggest refinements and styling techniques. Specialists in the Yaredic Zaima practice who can review the use cases and suggest others.

Viewing Note: The correct arrangement and styling of Zaima in this document is highly sensitive to browser version and typeface choices. This content has been optimized for viewing in the Chrome 60 web browser with the [Abyssinica SIL](#) font used for Ethiopic script samples. The content displays acceptably in Safari 11. Layout is entirely broken under Chrome 61, and mostly broken under Firefox 55. A [PDF version](#) of this page is offered as a reference for what correct layout presentation should appear like.

Zaima is the name given to the small cantillation annotations in the Ge'ez language hymnary that are rendered in one or more rows above base text. In this article the markup and CSS styling elements developed for rendering Ruby content are applied to Zaima samples that represent the most challenging use cases. The goal is to discover from application any limitations in markup and styling facilities to support the requirements of Zaima presentation and thus derive a complete model for Zaima representation.

An equally important goal in developing digitally rendered samples is determining with practitioners what characteristics of the calligraphic tradition must be preserved in electronic media. Stylistic features in Zaima presentation may be idiosyncratic to a scribe, artifacts of the scribal process and tools, and need not be rendered in electronic documents. Other features may convey meaning that is critical to the practice and must be rendered in the same way electronically.

USE CASES

Use cases are selected that represent particular challenges in presentation beyond the regular Ruby use cases. Use cases are borrowed from a previous survey in a, now deprecated, article on [Zaima Annotation](#) which in turn provides the full page sources of the samples appearing here.

The samples here present focused layout requirements in isolation from their larger context. Larger samples will be produced to help access the overall readability of electronically laid out Zaima in general, and to evaluate the layout choices made here.

Use Case 1

Features:

- Four rows of annotation.
- Fairly simple.
- Clear left align of , over **h** in 2nd row. Question: Is this positioning important vs a default center alignment?
- Spanning and centered milket on 2nd, 3rd and 4th rows over the last two letters. The spanning-centered layout may or may not be important.
- Use Case Question: What is the correct positioning of the annotation in all rows?
- *TBD: Add a context note (modes, ceremonies).*

Alternate Rendering

<pre> <ruby class="row4ex"> <rb>h</rb><rt></rt></rt> <rb>ᎡᎢᎣ</rb><rt>ᎤᎥ</rt> </ruby> <ruby class="row3ex"> <rb>h</rb><rt></rt> <rb>ᎡᎢᎣ</rb><rt>ᎤᎥᎧ</rt> </ruby> <ruby class="row2ex"> <rb>h</rb><rt style="text-align: left;">ᎤᎥ</rt> <rb>ᎡᎢᎣ</rb><rt>ᎤᎥᎧ</rt> </ruby> <ruby class="row1"> <rb>h</rb><rt></rt> <rb>ᎡᎢᎣ</rb><rt></rt> <rb>ᎤᎥᎧ</rb><rt>Ꭸ</rt> </ruby> </pre>	<pre> <ruby class="row4ex"> <rb>h</rb><rt></rt></rt> <rb>ᎡᎢᎣ</rb><rt>ᎤᎥ</rt> </ruby> <ruby class="row3ex"> <rb>h</rb><rt></rt> <rb>ᎡᎢᎣ</rb><rt>ᎤᎥᎧ</rt> <rb>ᎤᎥᎧ</rb><rt style="text-align: right;">ᎨᎩ</rt> </ruby> <ruby class="row2ex"> <rb>h</rb><rt>ᎤᎥ</rt> <rb>ᎡᎢᎣ</rb><rt></rt> <rb>ᎤᎥᎧ</rb><rt style="text-align: right;">ᎨᎩ</rt> </ruby> <ruby class="row1"> <rb>h</rb><rt></rt> <rb>ᎡᎢᎣ</rb><rt></rt> <rb>ᎤᎥᎧ</rb><rt style="text-align: right;">Ꭸ</rt> </ruby> </pre>	

Figure 1 Selot Kidassie p. 113

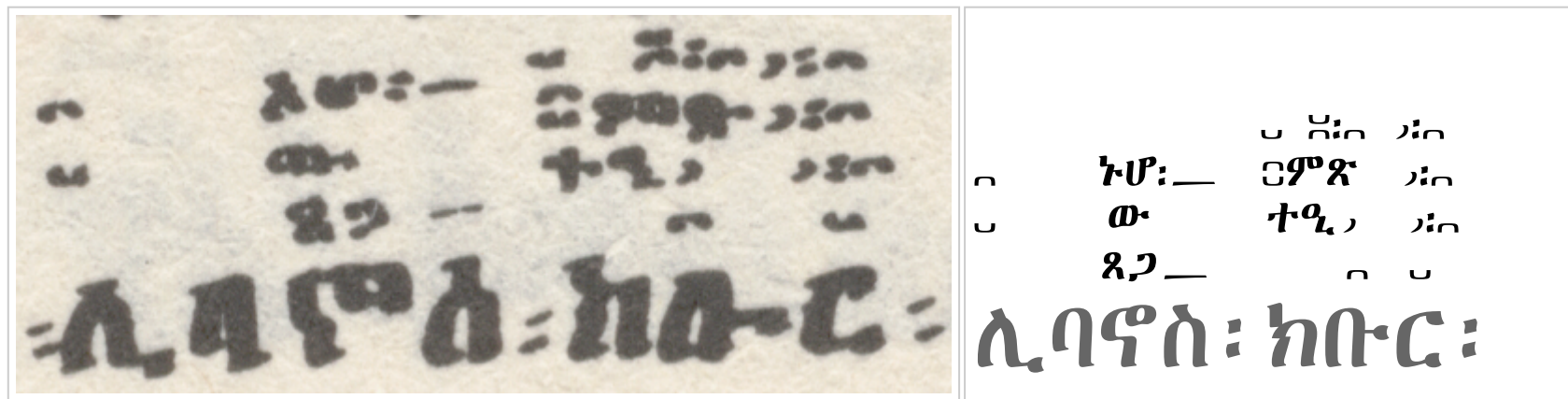
Issues:

- Had to specify a 2nd column width or the example gets cut off by the table. A rendering engine appears not be calculating cell content width correctly.
- In the alternative rendering, unable to right align ruby-text over the final base character on rows 1, 2 and 3 using "**ruby-align: right**".
- Ꭱ and Ꭲ on rows 2 and 3 respectively appear to overhang the right side of Ꭳ unexpectedly. Ꭳ on row one aligns with the right side of Ꭳ as expected. This may be attributable to the font and not the layout engine.
- Is the first or second rendering preferable? Does the difference impact vocalization?

Use Case 2

Features:

- Four rows of annotation.
- Apparent rise to the right of some rows up to Ꭱ then a descent to Ꭳ which may mirror a vocal rise and fall.
- Presence of the chords Ꭳ and Ꭴ which must render inline with a row.
- TBD: Add a context note (modes, ceremonies).



```

<ruby class="row4ex">
  <rb>ሊ</rb><rt><span></span></rt>
  <rb>ባ</rb><rt><span></span></rt>
  <rb>ኖ</rb><rt><span></span></rt>
  <rb>ስ</rb><rt><span></span></rt>
  <rb>፡ ከቡ</rb><rt style="text-align: center;"><span>&nbsp;<span class="diret_difat_ex"></span>፡፡</span></rt>
  <rb>ር</rb><rt><span>፡፡፡</span></rt>
</ruby>
<ruby class="row3ex">
  <rb>ሊ</rb><rt style="text-align: left;"><span>፡፡</span></rt>
  <rb>ባ</rb><rt><span></span></rt>
  <rb>ኖ</rb><rt><span>ኮሆ፡</span></rt>
  <rb>ስ</rb><rt><span>__</span></rt>
  <rb>፡ ከቡ</rb><rt><span><span class="difat_diret_ex"></span>፡፡፡</span></rt>
  <rb>ር</rb><rt><span>፡፡፡</span></rt>
</ruby>
<ruby class="row2ex">
  <rb>ሊ</rb><rt style="text-align: left;"><span>፡፡</span></rt>
  <rb>ባ</rb><rt><span></span></rt>
  <rb>ኖ</rb><rt><span>ው</span></rt>
  <rb>ስ</rb><rt>__</rt>
  <rb>፡ </rb><rt><span></span></rt>
  <rb>ከ</rb><rt><span>ተፊ፡</span></rt>
  <rb>ቡ</rb><rt style="text-align: left;"><span><span style="font-size: 25%;">&nbsp;</span>፡፡</span></rt>
  <rb>ር</rb><rt><span>፡፡፡</span></rt>
</ruby>
<ruby class="row1">
  <rb>ሊባኖስ</rb><rt></rt>
  <rb>ኖስ</rb><rt>፡፡፡</rt>
  <rb>ስ</rb><rt>__</rt>
  <rb>፡ </rb><rt></rt>
  <rb>ከ</rb><rt></rt>
  <rb>ቡ</rb><rt>፡፡</rt>
  <rb>ር</rb><rt>፡፡፡</rt>
</ruby>

```

Figure 2 Zimarie Wemewasit p. 34

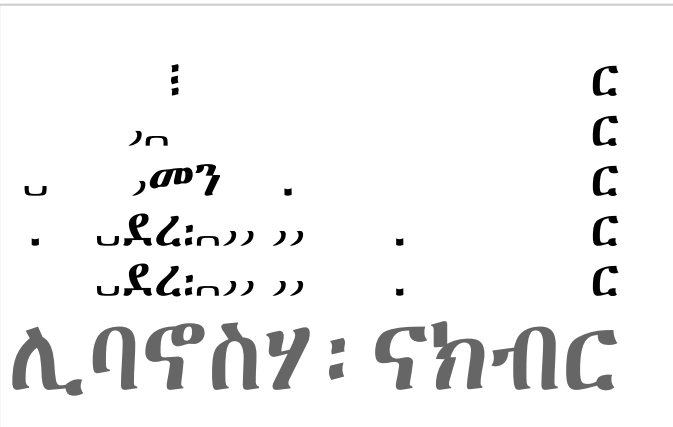
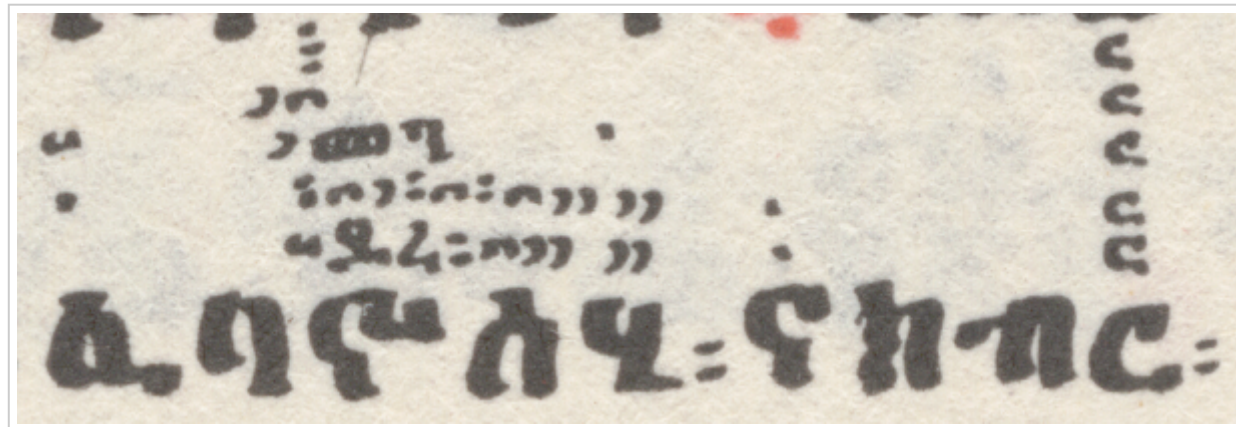
Issues:

- Could not center ፡ over ቡ in Row 2 because character width included the "u" diacritic mark. Desired "center" location was in the midline of the base glyph ቡ. Instead, "text-align: left;" is used with a right side space padding before the ፡ where the space used for padding is at a 25% scale.

Use Case 3

Features:

- Five rows of annotation.
- Apparent descent on first and second rows from ኖ to ሃ (which also appears to be a contiguous sequence).
- Clear distribution between letters ኖ and ከ on first and second rows.
- TBD: Add a context note (modes, ceremonies).



```

<ruby class="row5ex">
  <rb>ሊባ</rb><rt><span></span></rt>
  <rb>ኖ</rb><rt><span>፡</span></rt>
  <rb>ስሃ፡ ና</rb><rt><span></span></rt>
  <rb>ክብር</rb><rt><span>&nbsp;&nbsp;&nbsp;&nbsp;</span></rt>
  <rb>ር</rb><rt span style="text-align: right;"><span>ር</span></rt>
</ruby>
<ruby class="row4ex">
  <rb>ሊ</rb><rt><span></span></rt>
  <rb>ባኖ</rb><rt><span>፡</span></rt>
  <rb>ስሃ፡ ና</rb><rt><span></span></rt>
  <rb>ክብር</rb><rt><span>&nbsp;&nbsp;&nbsp;&nbsp;</span></rt>
  <rb>ር</rb><rt span style="text-align: right;"><span>ር</span></rt>
</ruby>
<ruby class="row3ex">
  <rb>ሊ</rb><rt><span>፡</span></rt>
  <rb>ባኖስ</rb><rt><span>፡</span></rt>
  <rb>ሃ</rb><rt><span>፡</span></rt>
  <rb>ናክብር</rb><rt><span></span></rt>
  <rb>ር</rb><rt span style="text-align: right;"><span>ር</span></rt>
</ruby>
<ruby class="row2ex">
  <rb>ሊ</rb><rt><span>፡</span></rt>
  <rb>ባኖስ</rb><rt><span>፡</span></rt>
  <rb>ሃ</rb><rt><span>፡</span></rt>
  <rb>፡</rb><rt></rt>
  <rb>ና</rb><rt><span>፡</span></rt>
  <rb>ክብር</rb><rt></rt>
  <rb>ር</rb><rt span style="text-align: right;"><span>ር</span></rt>
</ruby>
<ruby class="row1">
  <rb>ሊ</rb><rt></rt>
  <rb>ባኖስ</rb><rt>፡</rt>
  <rb>ሃ</rb><rt>፡</rt>
  <rb>፡</rb><rt></rt>
  <rb>ና</rb><rt>፡</rt>
  <rb>ክብር</rb><rt></rt>
  <rb>ር</rb><rt span style="text-align: right;"><span>ር</span>፡
</ruby>

```

Figure 3 Zimarie Wemewasit p. 34

Issues:

- Determine if ጸፈ is actually ጸፈ.
- Determine if the first and second rows sequence from ኖ to ሃ is indeed contiguous.
- Determine if the marks in the space inbetween ኖ and ስ is essential.

Features:

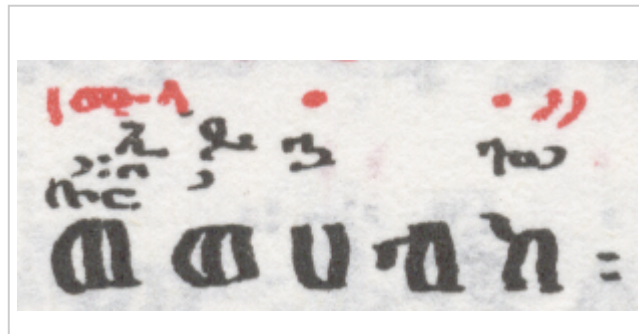
	<p>፤ሙላ ፡ ፡ ፡ ፡ ኢ ይ ኃ ጌ ፡፡ ፡ ፡ ቡር ወወሀብከ፡</p>	<p>፤ሙላ ፡ ፡ ፡ ፡ ኢይ ኃ ጌ ፡፡ ፡ ፡ ቡር ወወሀብከ፡</p>
<pre><ruby class="row4ex red-miliket"> <rb>ወወ</rb><rt>፤ሙላ</rt> <rb>ሀ</rb><rt>፡</rt> <rb>ብ</rb><rt></rt> <rb>ከ</rb><rt>፡፡</rt> </ruby> <ruby class="row3ex"> <rb>ወ</rb><rt>ኢ</rt> <rb>ወ</rb><rt>ይ</rt> <rb>ሀ</rb><rt>ኃ</rt> <rb>ብ</rb><rt></rt> <rb>ከ</rb><rt>ጌ</rt> </ruby> <ruby class="row2ex"> <rb>ወ</rb><rt>፡፡</rt> <rb>ወ</rb><rt>፡</rt> <rb>ሀብ</rb><rt></rt> <rb>ከ</rb><rt></rt> </ruby> <ruby class="row1"> <rb>ወ</rb><rt>ቡር</rt> <rb>ወሀብከ</rb><rt></rt> </ruby></pre>	<pre><ruby class="row4ex red-miliket"> <rb>ወወ</rb><rt>፤ሙላ</rt> <rb>ሀ</rb><rt>፡</rt> <rb>ብ</rb><rt></rt> <rb>ከ</rb><rt style="text-align: right;">፡፡</rt> </ruby> <ruby class="row3ex"> <rb>ወወ</rb><rt>ኢይ</rt> <rb>ሀ</rb><rt>ኃ</rt> <rb>ብ</rb><rt></rt> <rb>ከ</rb><rt style="text-align: right;">ጌ</rt> </ruby> <ruby class="row2ex"> <rb>ወ</rb><rt>፡፡</rt> <rb>ወ</rb><rt>፡</rt> <rb>ሀብ</rb><rt></rt> <rb>ከ</rb><rt></rt> </ruby> <ruby class="row1"> <rb>ወ</rb><rt>ቡር</rt> <rb>ወሀብከ</rb><rt></rt> </ruby></pre>	

Figure 5 Merha Liqawnt p. 127

Issues:

- Verify ይ or ዶ in row 3.
- Look up the milliket for ኢ, ይ, ኃ to determine if these are 1, 2 or 3 milliket and if they should be written contiguously.
- Right justify desired for ኢ above ወ on row 3, and for both ጌ and ፡፡ above ከ on rows 3 and 4 respectively
- ፡ would vanish if placed after the closing ruby tag as per:


```
<rb>ወሀብከ</rb><rt><span></span></rt></ruby>፡
```

 Accordingly it was placed just within the closing ruby tag as per:


```
<rb>ወሀብከ</rb><rt><span></span></rt>፡</ruby>
```

 This may be a browser issue or an issue with the markup approach taken.
- Is the first or second redendering preferable? Does the difference impact vocalization?

Use Case 6

Features:

- Three rows of annotation -verify that the apparent lower rows are independent.
- TBD: Add a context note (modes, ceremonies).

		
<pre> <ruby class="row3ex red-miliket"> <rb>ባ</rb><rt>፤</rt> <rb>ነሕ</rb><rt></rt> <rb>ሩ</rb><rt></rt> <rb>ን</rb><rt></rt> <rb>ኒ</rb><rt>...</rt> </ruby> <ruby class="row2ex"> <rb>ባነ</rb><rt>አጽነ</rt> <rb>ሕራንኒ</rb><rt></rt> </ruby> <ruby class="row1 red-base"> <rb>ባ</rb><rt> ></rt> <rb>ነሕ</rb><rt></rt> <rb>ሩ</rb><rt>ነ</rt> <rb>ንኒ</rb><rt>ርእሰ</rt>: </ruby> </pre>		<pre> <ruby class="row3ex red-miliket"> <rb>ባ</rb><rt></rt> <rb>ነሕ</rb><rt></rt> <rb>ሩ</rb><rt></rt> <rb>ን</rb><rt></rt> <rb>ኒ</rb><rt>...</rt> </ruby> <ruby class="row2ex"> <rb>ባ</rb><rt>አጽነ</rt> <rb>ነሕራንኒ</rb><rt></rt> </ruby> <ruby class="row1 red-base"> <rb>ባ</rb><rt> ></rt> <rb>ነሕ</rb><rt></rt> <rb>ሩ</rb><rt>ነ</rt> <rb>ንኒ</rb><rt>ርእሰ</rt>: </ruby> </pre>

Figure 6 Merha Liqawnt p. 128

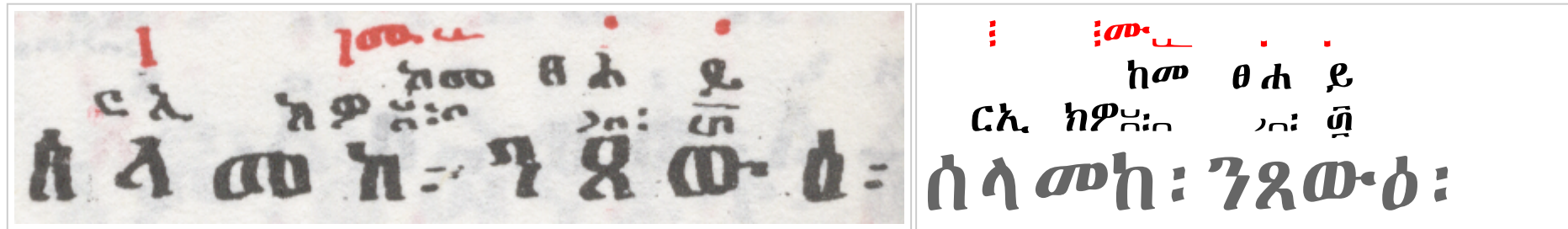
Issues:

- Determine if **ርእሰ** is one or two (**ርእ** & **ሰ**) milliket and space as needed.
- Determine if it is OK for **አጽነ** to extend over **ነ**.
- Is the first or second redendering preferable? Does the difference impact vocalization?

Use Case 7

Features:

- Three rows of annotation.
- Apparent overhang of ፤ from ከ.
- Example of ባ with omitted lower bar.
- TBD: Add a context note (modes, ceremonies).



```

<ruby class="row3ex red-miliket">
  <rb>ሰ</rb><rt><span></span></rt>
  <rb>ላ</rb><rt><span>፤</span></rt>
  <rb>መ</rb><rt><span></span></rt>
  <rb>ከ፡ </rb><rt><span>፤መ.ረ</span></rt>
  <rb>ጎ</rb><rt><span></span></rt>
  <rb>ጸ</rb><rt><span>.</span></rt>
  <rb>ው</rb><rt><span>.</span></rt>
  <rb>ሶ፡ </rb><rt><span></span></rt>
</ruby>
<ruby class="row2ex">
  <rb>ሰ</rb><rt><span></span></rt>
  <rb>ላ</rb><rt><span style="visibility: hidden;">ርሊ.</span></rt>
  <rb>መ</rb><rt><span></span></rt>
  <rb>ከ፡ </rb><rt><span>ከመ</span></rt>
  <rb>ጎ</rb><rt style="text-align: right;"><span>ፀ</span></rt>
  <rb>ጸ</rb><rt><span>ሐ</span></rt>
  <rb>ው</rb><rt><span>ይ.</span></rt>
  <rb>ሶ፡ </rb><rt><span></span></rt>
</ruby>
<ruby class="row1">
  <rb>ሰ</rb><rt></rt>
  <rb>ላ</rb><rt>ርሊ.</rt>
  <rb>መከ፡ </rb><rt>ከፀ<span class="diret_difat_ex"></span>፤.</rt>
  <rb>ጎ</rb><rt></rt>
  <rb>ጸ</rb><rt>፤.</rt>
  <rb>ው</rb><rt>፤.</rt>
  <rb>ሶ፡ </rb><rt></rt>
</ruby>

```

Figure 7 Merha Liqawnt p. 128

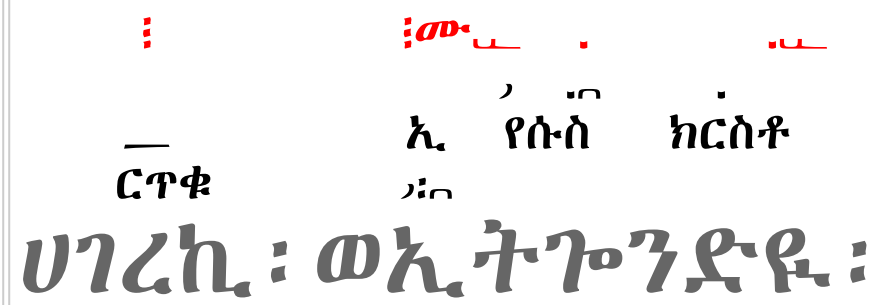
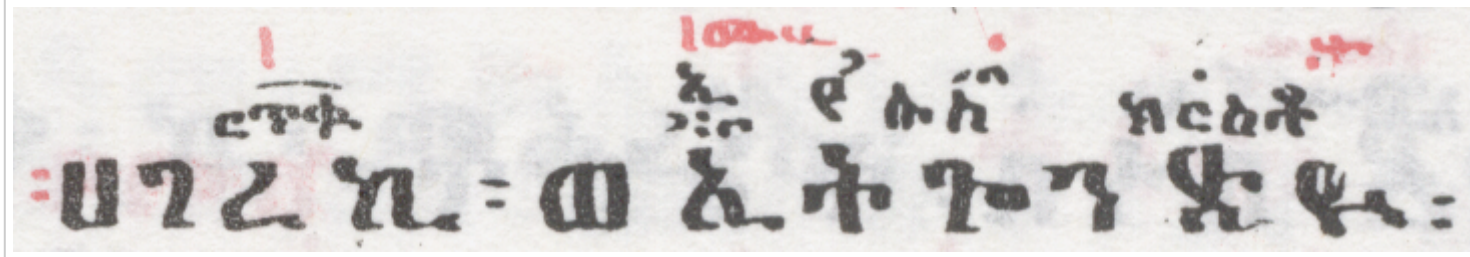
Issues:

- Top alignment of መ.ረ beside ፤ likely just due to the arrival of ከመ in the 2nd row and is not meaningful.
- ከመ ፀሐይ in the 2nd row is curious. Determine if this is miliket or another type of annotation.

Use Case 8

Features:

- Four rows of annotation -verify that the apparent lower rows are independent.
- Hidet above ርጎቁ may be possibly a case of a nested Ruby (annotation with annotation as per serayu). May also be an example of joining Hidet.
- TBD: Add a context note (modes, ceremonies).



```

<ruby class="row4ex red-miliket">
  <rb>ሀገ</rb><rt><span></span></rt>
  <rb>ረ</rb><rt><span>፡</span></rt>
  <rb>ኪ፡ ወ</rb><rt><span></span></rt>
  <rb>ኢት</rb><rt><span>፡መ.ሀ.</span></rt>
  <rb>ጎ</rb><rt><span></span></rt>
  <rb>ድ</rb><rt><span></span></rt>
  <rb>ዬ</rb><rt><span>.ሀ.</span></rt>
</ruby>
<ruby class="row3ex">
  <rb>ሀገ</rb><rt></rt>
  <rb>ረ</rb><rt></rt>
  <rb>ኪ፡ ወኢ.</rb><rt><span></span></rt>
  <rb>ት</rb><rt><span></span></rt>
  <rb>ጎ</rb><rt><span>..</span></rt>
  <rb>ን</rb><rt><span></span></rt>
  <rb>ድ</rb><rt><span></span></rt>
  <rb>ዬ</rb><rt><span></span></rt>
</ruby>
<ruby class="row2ex">
  <rb>ሀገ</rb><rt></rt>
  <rb>ረ</rb><rt><span>_</span></rt>
  <rb>ኪ፡ ወ</rb><rt></rt>
  <rb>ኢ.</rb><rt><span>ኢ.</span></rt>
  <rb>ትጎ</rb><rt><span>የሱስ</span></rt>
  <rb>ንድዬ</rb><rt><span>ክርስቶ</span></rt>
</ruby>
<ruby class="row1">
  <rb>ሀ</rb><rt></rt>
  <rb>ገረኪ.</rb><rt>ርጥቁ</rt>
  <rb>፡ ወ</rb><rt></rt>
  <rb>ኢ.</rb><rt>፡፡፡.</rt>
  <rb>ት</rb><rt></rt>
  <rb>ጎ</rb><rt></rt>
  <rb>ን</rb><rt></rt>
  <rb>ድ</rb><rt></rt>
  <rb>ዬ.</rb><rt></rt>
</ruby>

```

Figure 8 Merha Liqawnt p. 23

Issues:

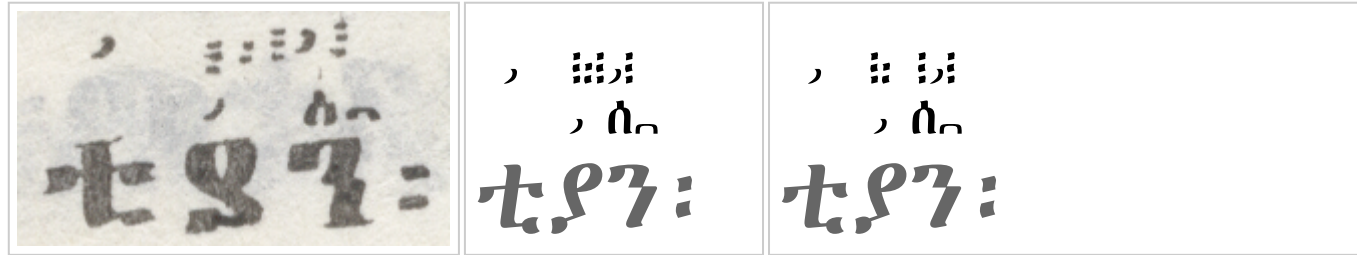
- ኢየሱስ ክርስቶ in the 2nd row is curious. Determine if this is miliket or another type of annotation.
- The Hidet alignment appears off in Safari, review in other browsers.

Use Case 9

Features:

- The ፡፡፡ sequence spans 2 letters along a render line rising at a slight angle to the right.
- The alternate rendering divides the ፡፡፡ sequence over ያ and ን separately.
- TBD: Add a context note (modes, ceremonies).

Alternate Rendering



```
<ruby class="row2ex">
<rb>ተ</rb><rt><span>,</span></rt>
<rb>ያ</rb><rt><span>:::;</span></rt>
</ruby>
<ruby class="row1">
<rb>ተ</rb><rt></rt>
<rb>ያ</rb><rt>,</rt>
<rb>ን</rb><rt>ሰ.</rt>:
</ruby>
```

```
<ruby class="row2ex">
<rb>ተ</rb><rt><span>,</span></rt>
<rb>ያ</rb><rt><span>:::</span></rt>
<rb>ን</rb><rt><span>:::</span></rt>
</ruby>
<ruby class="row1">
<rb>ተ</rb><rt></rt>
<rb>ያ</rb><rt>,</rt>
<rb>ን</rb><rt>ሰ.</rt>:
</ruby>
```

Figure 9 Selot Kidassie p. 9

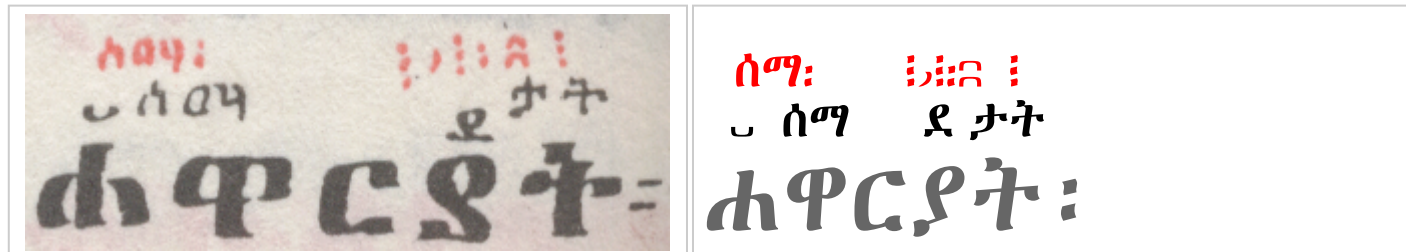
Issues:

- Unable to use "ruby-align: space-between;" to distribute ::: over ያን.
- Is anything lost when the rising qirts marks are arranged fully horizontal and not rising? Can the Zaima be reproduced vocally in the same way?
- Is the first or second redending preferable? Does the difference impact vocalization?

Use Case 10

Features:

- Fairly simple.
- Presence of the chord ሰግ which must render inline with a row.
- The ሰግ sequence spans 2 or possibly 3 letters along a render line rising at a slight angle to the right.
- TBD: Add a context note (modes, ceremonies).



```
<ruby class="row2ex red-miliket">
<rb>ሐዋ</rb><rt><span>ሰግ:</span></rt>
<rb>ር</rb><rt></rt>
<rb>ያት</rb><rt style="text-align: left; rotate(5deg);"><span>:::</span><span class="difat_difat_ex"></span> ::</span></rt>
</ruby>
<ruby class="row1">
<rb>ሐ</rb><rt>ሰግ.</rt>
<rb>ዋ</rb><rt>ሰግ.</rt>
<rb>ር</rb><rt></rt>
<rb>ያ</rb><rt>ደ.</rt>
<rb>ት</rb><rt>ታት.</rt>:
</ruby>
```

Figure 10 Selot Kidassie p. 129

Issues:

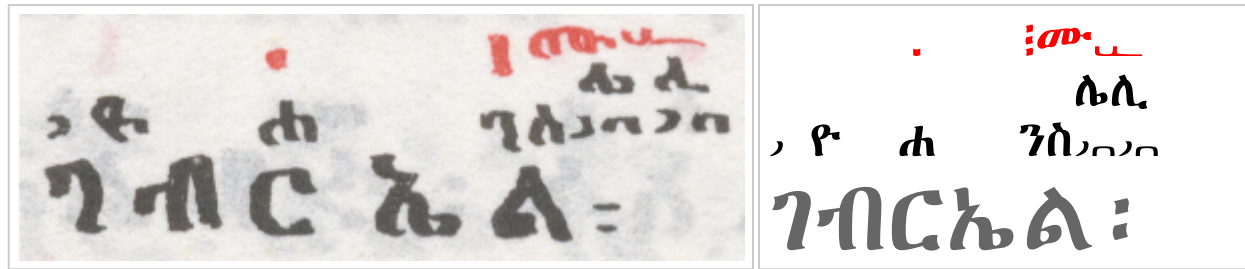
- Determine if the bottom row is actually two rows.

- Unable to use "ruby-align: space-between;" to distribute ፡፡፡ over ርዮጎ .
- `rotate(5deg)` has no effect, determine if misused.
- Determine if ጸ above የ might actually be ጸ .
- Is anything lost when the rising qirts marks are arranged fully horizontal and not rising? Can the Zaima be reproduced vocally in the same way?

Use Case 11

Features:

- Right side overhang, rising.
- Three part distribution of የሐጎስ .
- Use Case Question: How critical is it to reproduce the overhang as seen?
- *TBD: Add a context note (modes, ceremonies).*



```

<ruby class="row3ex red-miliket">
  <rb>ጎብ</rb><rt></rt>
  <rb>ር</rb><rt></rt>፡፡፡
  <rb>ል፡ </rb><rt><span>፡፡፡</span></rt>
</ruby>
<ruby class="row2ex">
  <rb>ጎብርኤ</rb><rt></rt>
  <rb>ል፡ </rb><rt><span>፡፡፡</span></rt>
</ruby>
<ruby class="row1">
  <rb>ጎብ</rb><rt style="ruby-align: start">፡፡፡</rt>
  <rb>ር</rb><rt>ሐ</rt>
  <rb>ኤ</rb><rt></rt>
  <rb>ል፡ </rb><rt>ጎስጎጎጎ</rt>
</ruby>

```

Figure 11 Selot Kidasie p. 83

Issues:

- The extent of overhang of the annotation is visually very different as a consequence of the typeface properties - does this matter?
- Top alignment of ፡፡፡ beside ፡ likely just due to the arrival of the ፡፡፡ in the 2nd row and not meaningful.
- Is ፡ left aligned with ጎ important, or may it be centered (default)?

Use Case 12

Features:

- Right side overhang, rising.
- Use Case Question: How critical is it to reproduce the overhang as seen?
- *TBD: Add a context note (modes, ceremonies).*



```
<ruby class="row2ex red-miliket">  
<rb>መ፡ </rb><rt><span>&nbsp;</span>&nbsp;</span></rt>  
<rb>ከ </rb><rt><span></span></rt>  
<rb>መ </rb><rt><span>&nbsp;</span></rt>  
</ruby>  
<ruby class="row1">  
<rb>መ፡ </rb><rt>&nbsp;</span></rt>  
<rb>ከመ፡ </rb><rt>ወተ </rt>፡  
</ruby>
```

Figure 12 Merha Liqawnt p. 66

Issues:

- The vertical red strokes are either a form of ፡ or ተ, check with an expert-practioner.

Use Case 13

Features:

- Inner overhang, falling.
- Use Case Question: How critical is it to reproduce the overhang as seen?
- TBD: Add a context note (modes, ceremonies).



```
<ruby class="row2ex red-miliket">  
<rb>ወተ &nbsp;</rb><rt style="text-align: left;"><span>&nbsp;</span>&nbsp;</span></rt>  
<rb>ነ፡ </rb><rt><span>ተመ፡ </span></rt>  
</ruby>  
<ruby class="row1">  
<rb>ወተ &nbsp;</rb><rt style="text-align: left;">ወተ፡ </rt>  
<rb>ነ፡ </rb><rt>፡ </rt>  
</ruby>
```

Figure 13 Merha Liqawnt p. 84

Issues:

- The vertical red strokes are either a form of ፡ or ተ, check with an expert-practioner.

Use Case 14

Features:

- Inner overhang.

- Use Case Question: How critical is it to reproduce the overhang as seen?
- TBD: Add a context note (modes, ceremonies).



```

<ruby class="row2ex red-miliket">
  <rb>ከ</rb><rt></rt>
  <rb>ያ</rb><rt><span>ተ</span></rt>
  <rb>ከ</rb><rt></rt>
  <rb>፡ አ &nbsp;</rb><rt style="text-align: left;"><span>&nbsp;</span> ተ&nbsp;</rt>
  <rb>ግ</rb><rt></rt>
</ruby>
<ruby class="row1">
  <rb>ከ</rb><rt></rt>
  <rb>ያ</rb><rt>ጽግ</rt>
  <rb>ከ</rb><rt></rt>
  <rb>፡ አ &nbsp;</rb><rt style="text-align: left;">&nbsp;</rt>
  <rb>ግ</rb><rt>መ</rt>
</ruby>

```

Figure 14 Merha Liqawnt p. 84

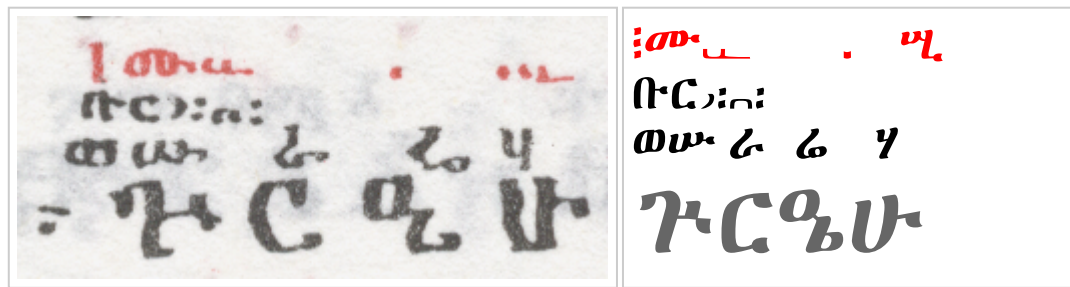
Issues:

- "text-align: left;" of ተ in the rt over ፡ አ had no effect, until an " " was added in the rb.
- An " " was added to after ፡ አ to force alignment of ተ over ፡ and not the white space before it. This forced space between ፡ and አ.
- The vertical red strokes are either a form of ተ or ተ, check with an expert-practioner.

Use Case 15

Features:

- Left side overhang.
- Use Case Question: How critical is it to reproduce the overhang as seen?
- TBD: Add a context note (modes, ceremonies).



```

<ruby class="row3ex red-miliket">
  <rb>ግ</rb><rt style="text-align: right;"><span>:መሠረተ</span></rt>
  <rb>ር</rb><rt></rt>
  <rb>ግ</rb><rt><span>.</span></rt>
  <rb>ሆ</rb><rt><span>ሲ</span></rt>
</ruby>
<ruby class="row2ex">
  <rb>ግ</rb><rt style="text-align: right;"><span>ግሪግ፡፡፡</span></rt>
  <rb>ርግሆ</rb><rt></rt>
</ruby>
<ruby class="row1">
  <rb>ግ</rb><rt style="text-align: right;">መሠረተ</rt>
  <rb>ር</rb><rt>ፊ</rt>
  <rb>ግ</rb><rt>ፊ</rt>
  <rb>ሆ</rb><rt>ሃ</rt>
</ruby>

```

Figure 15 Merha Liqawnt p. 21

Issues:

- Difficulty with positioning the first letter of each row to the left of ግ -is the left overhang critical.
- The calligraphic sample depicts no overhang from ግ to ር -is the digital form acceptable?
- Validate that ሲ is the correct symbol.
- Positioning of ሲ should align the diacritic symbol with the diacritic with ሆ.

Use Case 16

Features:

- Overlapping row position -row 2 overlaps rows 1 and 3.
- Use Case Question: How critical is it to reproduce the low overlap as seen?
- TBD: Add a context note (modes, ceremonies).

Alternate Rendering

	<p>በእ ቡብ ገጽ በእ ምሕረት</p>	<p>በእ ቡብ ገ ጸ በእ ምሕረት</p>
<pre><ruby class="row4ex"> <rb>ምሕ</rb><rt></rt> <rb>ረ</rb><rt>በእ</rt> <rb>ት</rb><rt></rt> </ruby> <ruby class="row3ex"> <rb>ምሕ</rb><rt></rt> <rb>ረ</rb><rt>ቡብ</rt> <rb>ት</rb><rt></rt> </ruby> <ruby class="row2ex red-miliket"> <rb>ምሕ</rb><rt></rt> <rb>ረ</rb><rt>ገጽ</rt> <rb>ት</rb><rt></rt> </ruby> <ruby class="row1"> <rb>ምሕ</rb><rt></rt> <rb>ረ</rb><rt>በእ</rt> <rb>ት</rb><rt></rt> </ruby></pre>	<pre><ruby class="row4ex"> <rb>ምሕ</rb><rt></rt> <rb>ረ</rb><rt>በእ</rt> <rb>ት</rb><rt></rt> </ruby> <ruby class="row3ex"> <rb>ምሕ</rb><rt></rt> <rb>ረ</rb><rt>ቡብ</rt> <rb>ት</rb><rt></rt> </ruby> <ruby class="row2ex red-miliket"> <rb>ምሕ</rb><rt></rt> <rb>ረ</rb><rt style="text-align: right;">ገጽ</rt> <rb>ት</rb><rt style="text-align: left;">ጸ</rt> </ruby> <ruby class="row1"> <rb>ምሕ</rb><rt></rt> <rb>ረ</rb><rt>በእ</rt> <rb>ት</rb><rt></rt> </ruby></pre>	

Figure 16 Selot Kidasie p. 213

Issues:

- Is the first or second redendering preferable? Does the difference impact vocalization?
- Verify spelling of **ገጽ**.
- If laying out **ገጽ** on its own row is appropriate, is using the default annotation alignment (centered) also appropriate or should the original be preserved?
- Rows 1 and 4 appear redundant in our isolated example, check the broader context of the line of text line.

Use Case 17

Features:

- Two or three rows of annotation.
- Apparent row overlap above **ገሴብሴ**.
- TBD: Add a context note (modes, ceremonies).

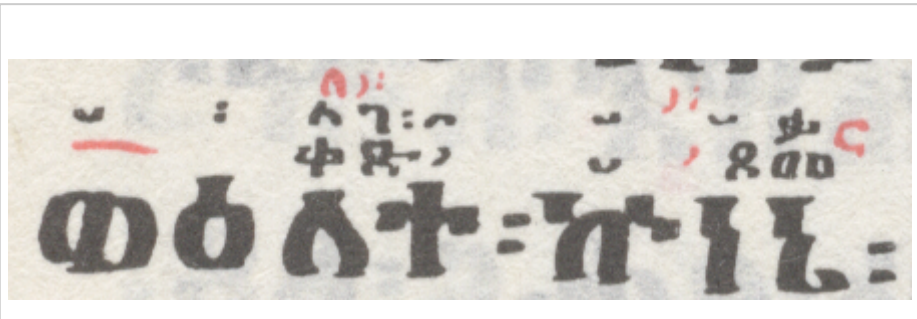

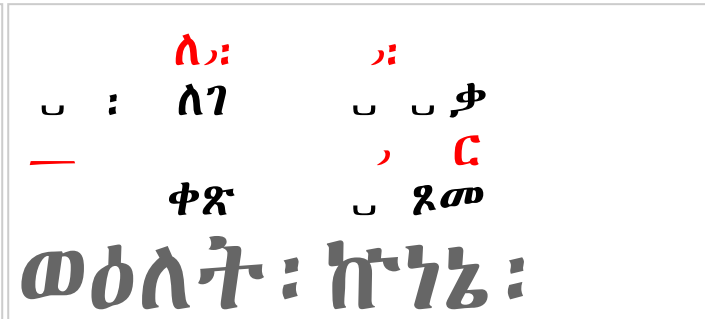
Issues:

- Determine if two or three rows are present above ዓሴ-ብሔ. If two rows, what is the context of the red annotation in the first row?
- Some 2nd row annotation appear very close to the first row, as if shadowing it, is this spacing required in digital form?
- If the first row red annotation above ሴ, ብ & ሔ belong in their own row, is using the default annotation alignment (centered) also appropriate or should the original be preserved?

Use Case 18

Features:

- Three or four rows of annotation.
- Second row (red) appears to collapse into the first row in several places.
- TBD: Add a context note (modes, ceremonies).

		Alternate Rendering
		
<pre> <ruby class="row3ex red-miliket"> <rb>ወ</rb><rt></rt> <rb>ሴ</rb><rt></rt> <rb>ለት</rb><rt>ሴ:</rt> <rb> : </rb><rt></rt> <rb>ኩ</rb><rt>:;</rt> <rb>ኔ</rb><rt></rt> </ruby> <ruby class="row2ex"> <rb>ወ</rb><rt>.</rt> <rb>ሴ</rb><rt>:</rt> <rb>ለት</rb><rt>ለገ</rt> <rb> : </rb><rt></rt> <rb>ኩ</rb><rt>.</rt> <rb>ኔ</rb><rt>.</rt> <rb>ኔ</rb><rt>ቃር</rt> </ruby> <ruby class="row1"> <rb>ወ</rb><rt>__</rt> <rb>ሴ</rb><rt></rt> <rb>ለት</rb><rt>ቃጽ</rt> <rb> : </rb><rt></rt> <rb>ኩ</rb><rt>.</rt> <rb>ኔ</rb><rt>.ጸመ</rt> : </ruby> </pre>	<pre> <ruby class="row4ex red-miliket"> <rb>ወ</rb><rt></rt> <rb>ሴ</rb><rt></rt> <rb>ለት</rb><rt>ሴ:</rt> <rb> : </rb><rt></rt> <rb>ኩ</rb><rt>:;</rt> <rb>ኔ</rb><rt></rt> </ruby> <ruby class="row3ex"> <rb>ወ</rb><rt>.</rt> <rb>ሴ</rb><rt>:</rt> <rb>ለት</rb><rt>ለገ</rt> <rb> : </rb><rt></rt> <rb>ኩ</rb><rt>.</rt> <rb>ኔ</rb><rt>.</rt> <rb>ኔ</rb><rt>ቃ</rt> </ruby> <ruby class="row2ex red-miliket"> <rb>ወ</rb><rt>__</rt> <rb>ሴ</rb><rt></rt> <rb>ለት</rb><rt></rt> <rb> : </rb><rt></rt> <rb>ኩ</rb><rt>.</rt> <rb>ኔ</rb><rt>ር</rt> </ruby> <ruby class="row1"> <rb>ወ</rb><rt></rt> <rb>ሴ</rb><rt></rt> <rb>ለት</rb><rt>ቃጽ</rt> <rb> : </rb><rt></rt> <rb>ኩ</rb><rt>.</rt> <rb>ኔ</rb><rt>ጸመ</rt> : </ruby> </pre>	

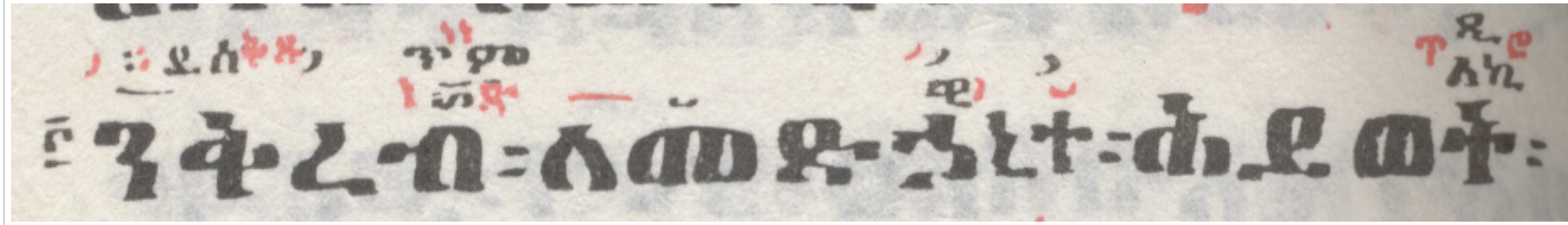
Issues:

- Determine if three or four rows are present. If three rows, what is the context of the red annotation in the first row?

Use Case 19

Features:

- Three to five rows of annotation.
- As with use cases 16-18, some red annotations may or may not represent separate rows.
- *TBD: Add a context note (modes, ceremonies).*



: ደስ , ጥም
: ቅጹ
— ሽ
፩
ከ
ጥር
ለኪ
ንቅረብ፡ ለመድኃኒተ፡ ሕይወት፡

```
<ruby class="row5ex red-miliket">  
<rb>ንቅረ</rb><rt><span></span></rt>  
<rb>ብ</rb><rt><span>ነ</span></rt>  
<rb>፡ ለመድኃኒተ፡ ሕይወት</rb><rt><span></span></rt>  
</ruby>
```

```
<ruby class="row4ex">  
<rb>ን</rb><rt><span></span></rt>  
<rb>ቅ</rb><rt><span>ደስ</span></rt>  
<rb>ረ</rb><rt><span>,</span></rt>  
<rb>ብ</rb><rt><span>ጥም</span></rt>  
<rb>፡ ለመድኃኒተ፡ ሕይወት</rb><rt><span></span></rt>  
<rb>ት</rb><rt><span>ጸ</span></rt>፡  
</ruby>
```

```
<ruby class="row3ex red-miliket">  
<rb>ን</rb><rt><span>፡</span></rt>  
<rb>ቅረ</rb><rt><span>ቅጹ</span></rt>  
<rb>ብ</rb><rt><span></span></rt>  
<rb>፡ </rb><rt><span></span></rt>  
<rb>ለ</rb><rt><span></span></rt>  
<rb>መ</rb><rt><span></span></rt>  
<rb>ድ</rb><rt><span></span></rt>  
<rb>ኃ</rb><rt><span>,</span></rt>  
<rb>ኒ</rb><rt><span></span></rt>  
<rb>ተ</rb><rt><span>,</span></rt>  
<rb>፡ ሕይወት</rb><rt><span></span></rt>  
<rb>ት</rb><rt><span>ጥር</span></rt>፡  
</ruby>
```

```
<ruby class="row2ex">  
<rb>ንቅረ</rb><rt><span>__</span></rt>  
<rb>ብ</rb><rt><span>ሽ</span></rt>  
<rb>፡ </rb><rt><span></span></rt>  
<rb>ለ</rb><rt><span></span></rt>  
<rb>መ</rb><rt><span>.</span></rt>  
<rb>ድ</rb><rt><span></span></rt>  
<rb>ኃ</rb><rt><span>ዊ</span></rt>  
<rb>ኒ</rb><rt><span></span></rt>  
<rb>ተ</rb><rt><span></span></rt>  
<rb>፡ ሕይወት</rb><rt><span></span></rt>  
<rb>ት</rb><rt><span>ለኪ</span></rt>፡  
</ruby>
```

```
<ruby class="row1 red-miliket">  
<rb>ንቅረ</rb><rt><span></span></rt>  
<rb>ብ</rb><rt><span>፩</span></rt>  
<rb>፡ </rb><rt><span></span></rt>  
<rb>ለ</rb><rt><span>__</span></rt>  
<rb>መ</rb><rt><span></span></rt>  
<rb>ድ</rb><rt><span></span></rt>  
<rb>ኃኒ</rb><rt><span>,</span></rt>  
<rb>ተ</rb><rt><span>.</span></rt>  
<rb>፡ ሕይወት</rb><rt><span></span></rt>  
<rb>ት</rb><rt><span></span></rt>፡  
</ruby>
```

Figure 19 Selot Kidasie p. 189

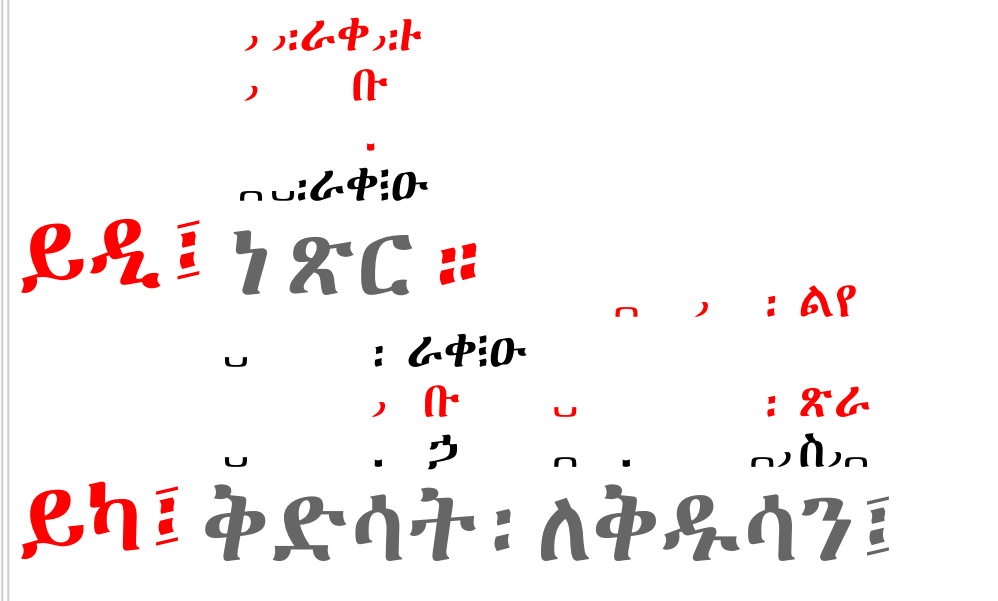
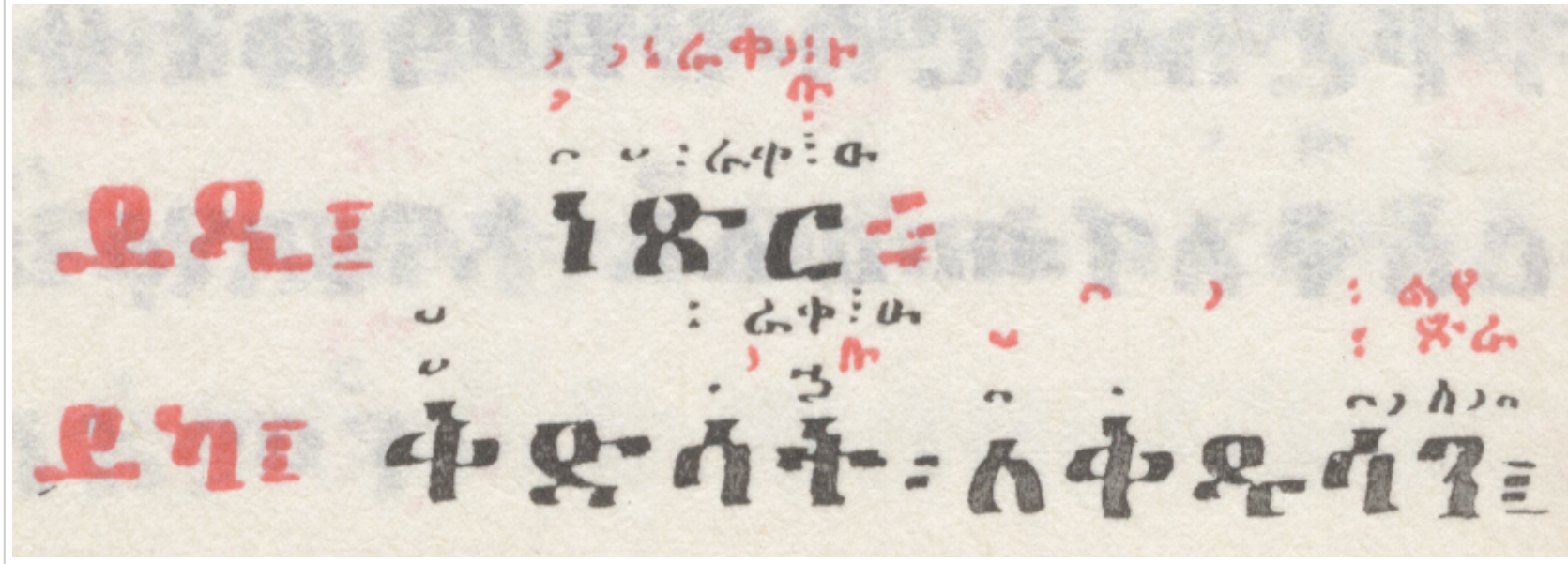
Issues:

- Determine if three, four or five rows are present. If three rows, what is the context of the red annotation in the lower rows?
- Some 2nd row annotation appear very close to the first row, as if shadowing it, is this spacing required in digital form?
- If the first row red annotation above **ሴ**, **ብ** & **ክ** belong in their own row, is using the default annotation alignment (centered) also appropriate or should the original be preserved?
- As with similar occurrences in Use Cases 16 & 17, is the repositioning of **፳** above **ብ** appropriate?

Use Case 20

Features:

- Three or four rows of annotation.
- As with use cases 16-19, some red annotations may or may not represent separate rows.
- *TBD: Add a context note (modes, ceremonies).*



```

<span style="font-size: 50px; color: red;">ደዲ፤ </span>
<ruby class="row4ex red-miliket">
  <rb>ነ</rb><rt><span>.</span></rt>
  <rb>ጽር</rb><rt><span>.:ፊቀ:ተ</span></rt>
</ruby>
<ruby class="row3ex red-miliket">
  <rb>ነ</rb><rt><span>.</span></rt>
  <rb>ጽ</rb><rt><span></span></rt>
  <rb>ር</rb><rt><span>ቡ</span></rt>
</ruby>
<ruby class="row2ex red-miliket">
  <rb>ነጽ</rb><rt><span></span></rt>
  <rb>ር</rb><rt><span>.</span></rt>
</ruby>
<ruby class="row1">
  <rb>ነ</rb><rt>.</rt>
  <rb>ጽር</rb><rt>.:ፊቀ:ፀ</rt><span style="color: red;"># </span>
</ruby>
<br/> <br/> <br/>
<span style="font-size: 50px; color: red;">ደካ፤ </span>
<ruby class="row4ex red-miliket">
  <rb>ቅድሳት፡ ለ</rb><rt></rt>
  <rb>ቅ</rb><rt><span>.</span></rt>
  <rb>ዱ</rb><rt><span>.</span></rt>
  <rb>ላ</rb><rt><span>: </span></rt>
  <rb>ን</rb><rt><span>ልፆ</span></rt>
</ruby>
<ruby class="row3ex">
  <rb>ቅ</rb><rt><span>.</span></rt>
  <rb>ዱ</rb><rt></rt>
  <rb>ላ</rb><rt><span>:</span></rt>
  <rb>ት</rb><rt><span>ፊቀ:ፀ</span></rt>
  <rb>፡ ለቅዱሳን፤ </rb><rt></rt>
</ruby>
<ruby class="row2ex red-miliket">
  <rb>ቅ</rb><rt></rt>
  <rb>ዱ</rb><rt></rt>
  <rb>ላ</rb><rt><span>.</span></rt>
  <rb>ት</rb><rt><span>ቡ</span></rt>
  <rb>፡ </rb><rt></rt>
  <rb>ላ</rb><rt><span>.</span></rt>
  <rb>ቅዱ</rb><rt></rt>
  <rb>ላ</rb><rt><span>:</span></rt>
  <rb>ን፤ </rb><rt style="text-align: left;"><span>ጽፈ</span></rt>
</ruby>
<ruby class="row1">
  <rb>ቅ</rb><rt>.</rt>
  <rb>ዱ</rb><rt></rt>
  <rb>ላ</rb><rt></rt>

```

```

<rb>ት</rb><rt>ጐ</rt>
<rb>፡</rb><rt></rt>
<rb>ለ</rb><rt>..</rt>
<rb>ቅ</rb><rt>.</rt>
<rb>ዱ</rb><rt></rt>
<rb>ሳ</rb><rt>..</rt>
<rb>ኃ፤</rb><rt style="text-align: left;">ስ..</rt>
</ruby>

```

Figure 20 Selot Kidasie p. 253

Issues:

- As with similar occurrences in Use Cases 16-19, is the repositioning of ቡ above ኃ appropriate?

BROWSER SUPPORT

The article describes behavior for the following browser versions. We will try to update the article as behavior changes.

Browser	Version	Engine	Other browsers using that engine
Chrome Chrome	60.0.3112.113	Blink	Opera, Vivaldi, etc.
Safari Safari	Version 11.0 (11604.1.38.1.7)	WebKit	iOS-based browsers, Yandex, UC Browser, etc.

Normative References

Tu'um Lisan Kasa, *ያሬድና ዜማው* Yared Zeimaw, Tinsaie Zegubaie Matemiyā Beit, Addis Ababa, 1981EC/1988
 YeTinsaie YeMetsahft Mastemiyā Dirjit, *የዜማ አርዕስት ምልክት* YeZaima Arist Millikt, Addis Ababa, 1983EC/1990
 Birhanu Gesesse, Merigeta Dimtse, Priest and Zaima teacher at Urael Orthodox Church, Addis Ababa, 1999
 Tinsaie Zegubaie Matamiya Beit, *የቅዱስ ያሬድ ታሪክና የዜማ ምልክቶች* YeKidus Yared Tarikna YeZaima Milketoc, Tinsaie Zegubaie Matemiyā Beit, Addis Ababa, 1959EC/1966

Informative References

Afewerk Ambaw, Memhir, *ቅመተ አርያም* K'wumete Aryam, Bahir Dar Matemiyā Beit Tāteme, Bahir Dar, 1990EC/1998
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