

To: Script Encoding Working Group and UTC  
 From: Denis Moyogo Jacquerye  
 RE: Alpha Feedback on Cossic characters (N5333R2)  
 2026-03-31 (r1)

The main point of this feedback is based on the following statement in N5333R2:

> These characters [...] show a combination of a modified basic shape with some sort of graphic  
 > attachment, like scriptive loops directly connected to or crossing the base glyph.

These graphic attachments are abbreviative strokes through the terminal stroke or, when the pen is not raised, abbreviative loops and, in the case of long s, wavy lines. Some of these characters are composed of forms already encoded. This should be reflected in the character names for those Cossic symbols.

#### 1. Abbreviative stroke

1.a. Some characters with abbreviative strokes have already been encoded as

LATIN SMALL LETTER DUM,  
 LATIN SMALL LETTER LUM,  
 LATIN SMALL LETTER MUM,  
 LATIN SMALL LETTER NUM,  
 LATIN SMALL LETTER RUM,  
 LATIN SMALL LETTER RUM ROTUNDA,  
 LATIN SMALL LETTER TUM.

This stroke is also the diagonal stroke in some other characters like LATIN SMALL LETTER LONG S WITH DIAGONAL STROKE and LATIN SMALL LETTER V WITH STROKE or in characters unified with their various stroked forms in particular when the stroke does not go through the terminal stroke of the letter.

The looped or angular form of the abbreviative stroke has been encoded as LATIN SMALL LETTER IS, as well as its capital character, and its more decorative form as LATIN SMALL LETTER UM.

The nature of the abbreviative stroke is discussed several paleographic reference, for example in Adriano Capelli, *Lexicon abbreviaturarum* in Italian, or in the German and English translations. See <https://archive.org/details/abbreviaturas-latinas/page/2/mode/2up>.

#### 1. 1DF90 LATIN LETTER SMALL C WITH SMALL SLASH

1.a. The small slash is not small in 2 of the 3 samples shown in N5333R2. Only Leibniz 1676 shows a short slash (sometimes with a loop). While Beekman 1628 is shown with an unclear slash, it has a clearly longer slash in better scans

like <https://archive.org/details/journaltenuparis03beec/page/n14/mode/1up>.

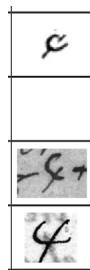



Figure 1.1. Cf. page 19 of N5333R2 proposal. Showing a poor scan of Beekman 1628 (first row).



Figure 1.2. better can of Beekman 1628.

Recommendation: Modify glyph to have a longer slash

1.b. Lindsay 1908, *Contractions in early Latin minuscule MSS*, p. 50 (<https://archive.org/details/contractionsinea00linduoft/page/50/mode/1up>) does mention a c with a short slash as an abbreviation of "cum" in "locum" in Vat. 5763: . But in most cases the abbreviative stroke is either longer or through the top stroke.

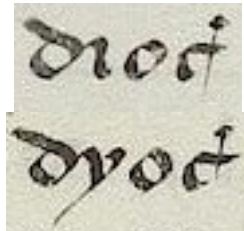


Figure 1.3. dioc[esis] or dyoc[esis] in the manuscript Freiburg i. Br., Hs. 12.

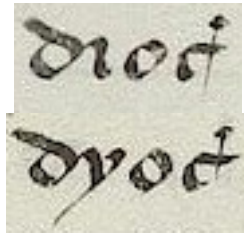


Figure 1.3. dioc[esis] or dyoc[esis] in the manuscript Freiburg i. Br., Hs. 12.

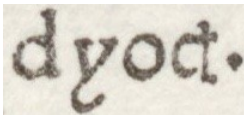


Figure 1.4. dioc[esis] in print in *Rota Romana, Decisiones Rotae Romanae, 2 Decisiones novae*, Rome, 1472

Cappelli shows both top loop and top abbreviative strokes with c for etcaetera: <https://archive.org/details/lexiconabbreviat00capp/page/35/mode/1up?q=caetera>

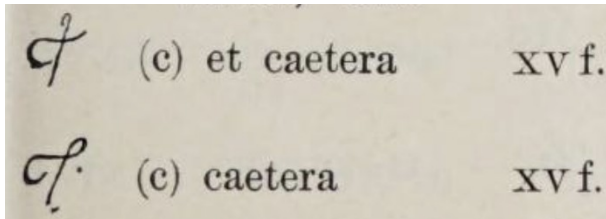


Figure 1.5. Cappelli 1901, p. 35.



Figure 1.6. In the manuscript Céret, Archives municipales, AA 1\* the looped form is a variant with the loop below.

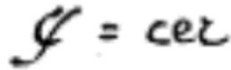


Figure 1.7. Carlo Malagola, *Appunti delle lezioni del corso ufficiale di Paleografia e Diplomatica*, Università di Bologna, 1899, p. 14, notes it was used for "cer".

The character could be called LATIN SMALL LETTER CUM (or CER) or LATIN SMALL LETTER C WITH ABBREVIATIVE STROKE as its stroke is not short in all forms.

**Recommendation: Change name to reflect its stroke is not short in all forms.**

## 2. LATIN LETTER SMALL C WITH DESCENDING LOOP

2.a. This is a C WITH CEDILLA with an abbreviative stroke. Peletier uses his proposed orthography in Peletier 1554 where Çanse and Çansique are used. Like the other Cossic symbols, a symbol based on the base letter with an abbreviative attachment is used. French authors citing Peletier typically use the C WITH CEDILLA when trying to represent this symbol.

This should be called something like LATIN SMALL LETTER C WITH CEDILLA WITH ABBREVIATIVE STROKE or LATIN SMALL LETTER C WITH SLASHED CEDILLA, or, if the stroke must be attached with a loop, LATIN SMALL LETTER C WITH LOOPED CEDILLA.

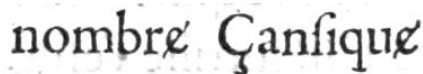


Figure 2.1. "nombre Çansique" in Peletier 1544.

**Recommendation: Change name to reflect the cedilla has an abbreviative stroke.**

## 3. LATIN LETTER SMALL C WITH RIGHT LOOP

This is effectively a variant of the c with abbreviative stroke but with the loop form of the abbreviative attachment, encoded as LATIN SMALL LETTER IS in Unicode. This could also have been called LATIN SMALL LETTER C IS or something based on the loop-less character's name like LATIN SMALL LETTER CUM WITH TOP LOOP (or CER WITH TOP LOOP). A note should indicate abbreviations should use LATIN SMALL LETTER IS instead, even when it has the loop form rather than the angular form.

**Recommendation: Add an annotation that abbreviations should use LATIN SMALL LETTER IS instead, even when it has the loop form rather than the angular form.**

## 4. LATIN LETTER SMALL D ROTUNDA WITH CROSSING LOOP

4.a. This is a form of U+A771 LATIN SMALL LETTER DUM in Gothic Cursiva or Hybrida, used for -

dum or other abbreviations, where the top loop is formed as the pen is not raised before the inclined stem and the abbreviative stroke does not cross a stem but is a down stroke (often hooked).

While the LATIN SMALL LETTER DUM has been encoded for 8-11th century forms of the letter, there is an evolution of the letter form that does lead to the one use for the Cossic symbol. For example when LETTER DUM was proposed, it was noted it was used for Portuguese abbreviations after the 15th century, which does use the same form as the Cossic symbol in some documents and the form with the looped or angular letter is in other documents.

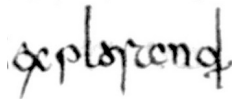


Figure 4.1. The older form in "explorend[um]" in Leo I Magnus, *Collectio canonum Dionysio-Hadriana* - BNF Latin 8921, 775-800.

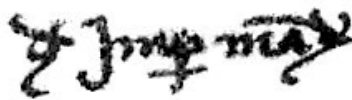


Figure 4.2. An intermediary form in "d[e] imp[erio] ma[n]d[ato]" in Naples, Regio Archivio di Stato, *Regestum Friderici II. Imperatoris*, 1240.

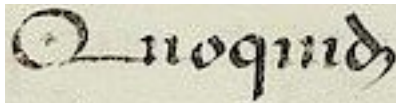


Figure 4.3. Another intermediary form in "Quoquid[em]" in *Decreta et acta concilii Basiliensis* - Universitätsbibliothek Freiburg i. Br., Hs. 12, 1440 circa:



Figure 4.4. Another intermediary form in "eosdem" in BNF Picardie 295, f. 112r23.

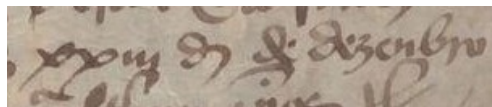


Figure 4.5. The Portuguese abbreviation for "dias" in "xxij d[ias] de dezembro" in *Ordem de São Jerónimo, Livro das profissões do Mosteiro de São Lourenço de Peralonga da Ordem de S. Jerónimo*, 1479-1509:

See also E. Borges Nunes (1981), *Abreviaturas Paleográficas Portuguesas*, p. 41.

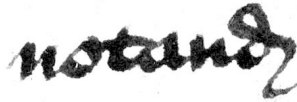


Figure 4.6. Compare with the Cossic symbol with the dum in "notand[um]" in Gilbertus Anglicus, *Practica medicinae* (Miscellanea Medica VII), MS.537, 1462.

4.b. The D ROTUNDA is called INSULAR D, as in U+A77A LATIN SMALL LETTER INSULAR D, in Unicode. This character's name should be clearer. While this form of d is named variously round d, d rotunda, inclined d, slanted d, uncial d, etc., it is called INSULAR D in Unicode. It should have INSULAR D in its name or a note should indicate INSULAR D is also called D ROTUNDA.

**Recommendation: Consider adding a note to INSULAR D that it is also called D ROTUNDA.**

4.c. In some Gothic Cursiva, the  $\text{d}$  LATIN SMALL LETTER D WITH STROKE or  $\text{ð}$  LATIN SMALL LETTER ETH, used for "der" in some languages, or "daer" in Middle Dutch or Dutch, has a crossing loop ending with an upward stroke or upward hooked stroke when the pen is not raised. CROSSING LOOP may not be specific enough, especially since the normal looped form of the letter (without the abbreviative stroke) make have a crossing loop.

Like RUM, RUM ROTUNDA or the new RUM ROTUNDA WITH LOOP, this character could be called LATIN SMALL LETTER INSULAR DUM WITH TOP LOOP. Using INSULAR indicates the d rotunda form, DUM indicates there is an abbreviative stroke and TOP LOOP indicates the top loop of this Cursiva form.

**Recommendation: Change name to LATIN SMALL LETTER INSULAR DUM WITH TOP LOOP.**

## 5. LATIN LETTER SMALL R ROTUNDA WITH LOOP

This should be called LATIN SMALL LETTER RUM ROTUNDA WITH LOOP. The letter is not an r rotunda with a loop but a rum rotunda where the pen is not lifted when going from the final stroke of the base letter to the abbreviative stroke.

It should be noted that in Leibniz MS 1676, the RUM form (R ROTUNDA with a stroke) is used in Descartes notes and the loop form is only used when the pen is not raised before the stroke. Some other manuscripts or printed works also used the RUM as is.

Additionally, in some works, like Apian 1527 or Halcken 1719, an antiqua r is used instead of a r rotunda, but that form was confusable with the C WITH LOOP because of the ductus of c in Gothic hands. This would be RUM WITH LOOP, not R WITH LOOP.

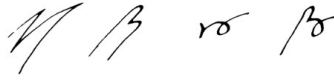
**Recommendation: Change name to LATIN SMALL LETTER RUM ROTUNDA WITH LOOP.**

## 6. LATIN SMALL LIGATURE LONG S WITH DESCENDER S

6.a. This is rather problematic for various reasons. The first one being that the letter is identified as a strict long s-s ligature when there are examples of other forms. Looking at paleographic references and Cossic manuscripts, it is apparent this is an abbreviative s rather than a separate symbol. One issue here is that it is not a straight case of a base letter with an abbreviative stroke or loop. However, paleographic references typically treat its forms as forms of the abbreviative s, for example Reusens 1899 (see below), which may be encoded with more than one character. But it's not clear if this needs another character.

- de dubbele s :

- le double s :



De vorm  $\beta$  is eigenlijk de combinatie van een lange en een ronde s. Ze wordt gemakkelijk verward met :

La forme  $\beta$  est en fait la combinaison d'un s long et d'un s rond. Il est facile de la confondre avec :

- de Ringel s :

- le Ringel-s :



- de s + afkorting

- le s + abréviation

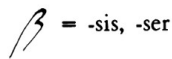


Figure 6.1. Dekker, Baetens et Maarschalkerweerd-Dechamps 1992, p. xxiv, noting the long s and round s ligature can be confused for both the eszett and the s with abbreviative stroke.

Il se place sous le crochet de la lettre  $\mathfrak{f}$ ,  $\mathfrak{F}$ , ou s'y rattache,  $\mathfrak{f}$ , en formant une boucle complète. Dans l'écriture cursive, il prend aussi, en se

reliant à s, la forme suivante :  $\beta$ . Enfin, il se combine avec  $\mathfrak{z}$  en tranchant le premier montant de cette lettre,  $\mathfrak{z}$ .

Figure 6.2. Reusens 1899, p. 99-100, noting the abbreviative stroke can be under the hook of the long s, attached to it with a loop or, in cursive, can take the form shown (similar to long s + looped z).

6.b. U+A7D7 LATIN SMALL LETTER MIDDLE SCOTS S represents the same abbreviative s. It is derived from a form of LATIN SMALL LETTER LONG S WITH DIAGONAL STROKE used for "ser" and other abbreviations, where the top hook of the long s is connected to the start of the hooked stroke, thus looking like a king of beta. In various styles, this abbreviative s has the right part drawn rapidly as a waving line, or with an ending loop. These forms have been used in Middle Scots and Middle English as abbreviations of ser/sir or -ses, but also in Latin for er or -sis, in French for sire/seigneur, and in Spanish, Catalan, Italian as well. They also have been used in German or Dutch. According to Wilhelm Wattenbach, *Anleitung zur lateinischen Palaeographie*, 1878, p. 50

([https://archive.org/details/anleitungzurlate00watt\\_0/page/n59/mode/1up](https://archive.org/details/anleitungzurlate00watt_0/page/n59/mode/1up)), the abbreviative s form has also been used in some cases for the long s-z ligature. This confusion is hard to detangle, but the MIDDLE SCOTS S has already been encoded as distinct from the SHARP S for the abbreviative s. One issue with MIDDLE SCOTS S is that the representative glyph is based on one of the 19th century interpretations of one of the abbreviative s form, which doesn't directly look like the printed characters used in Cossic works. If the MIDDLE SCOTS S representative glyph was changed for a more generic one (descending instead of on the baseline), the overly specific name would still be an issue.

The various forms of this abbreviative s have been used for the currency solidus or the alchemical "semis" as well.

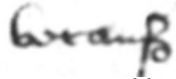


Figure 6.3. Middle Scots s in "becaus[e]" in Letter signed by King James IV, 11 April 1464, in Simpson 2009, plate 13, in L2/20-267.



Figure 6.4. Middle Scots s in "S[er]ve" in Egerton MS 2880, 16th century, f. 100v, in L2/20-267.

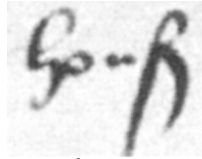


Figure 6.5. Middle Scots in "hous[e]" in Treasurer's account, 1505 in Simpson 2009, plate 14, in L2/20-267.

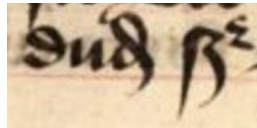


Figure 6.6. Abbreviative s in "Dud[ict] s[eigneu]r" in Olivier de la Marche, Gent Universiteitsbibliotheek, G 4389, circa 1475.

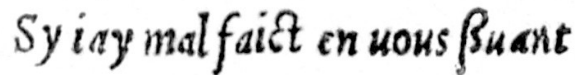


Figure 6.7. Abbreviative s in "s[er]vant" in Le douziesme livre contenant trente chansons amoureuse a cinq parties, vol. Contratenor, 1550.

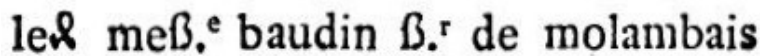


Figure 6.8. Abbreviative s in "le[dit] mes[sir]e Baudin s[eigneu]r de Molambais" in Verzameling van XXIV. origineele charters, 1788.

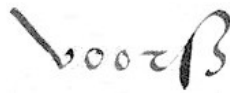


Figure 6.9. Abbreviative s in "voors[eid]" (old spelling for "voorz[eid]") in Octrooi voor de VOC, 1602.

There are also rare cases where the abbreviative s is represented with long s and a LATIN SMALL LETTER IS.



Figure 6.10. "voors[eid]" in Ordonnantien Statuten, Edicten en Placcaten, ghepubliceert in de landen van hervvaerts ouer byzonder in Vlaendren, 1559.

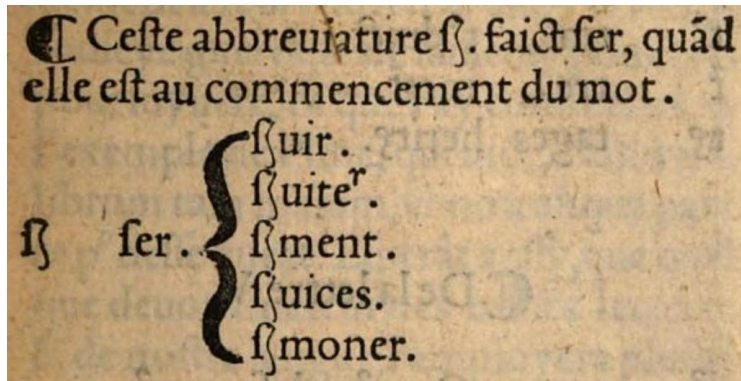


Figure 6.11. “ser” (also “ses”) in Pierre Haschaert, *La maniere d’escripre par abbreviations. Avec un petit traicté de l’orthographe Françoise*, 1544.

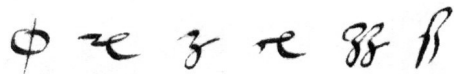


Figure 6.12. Cossic abbreviative s in Mscr.Dresd.C.349, 16th century.



Figure 6.13. Mscr.Dresd.C.4, 1596-1597.



Figure 6.14. Mscr.Dresd.C.8, 16th century.

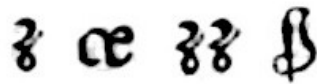


Figure 6.15. Abraham de Graaf, *Principia arithmeticae, theoreticae, & practicae*, 1662.

7.b. While several Cossic works use the italic long s-s ligature or its upright form (descending long s-s ligature) many use the long s-sigmoid s ligature.



Figure 6.16. Thomas Masterson, *His third booke arithmeticke*, 1595.



Figure 6.17. Nicolaus Reimarus Ursus, *Arithmetica analytica, vulgo cosa, oder Algebra*, 1601.



Figure 6.18. Nicholaus Peters, *Practique om te leeren rekenen, cypheren ende boeckhouden*, 1605 also uses a form similar to some of our modern long s-s SHARP S.

Recommendation: reconsider whether 1) this is a glyphic variant of MIDDLE SCOTS S or 2) this is strictly a LIGATURE LONG S S (descending or not) not covering other variants of the symbol and whether other variants are needed.

## 7. LATIN LETTER SMALL LONG S WITH TOP LOOP

7.a. This character should have been better documented before being added. The analysis of the proposal is as good as any other educated guess given the single sample and its mismatch of character size and vertical positions.

In Wallis 1657, the character doesn't actually look like the proposed glyph of LATIN LETTER SMALL LONG S WITH TOP LOOP. The left stroke starts below the comparative baseline and the loop is larger and almost on the comparative baseline. Within context (other text in a different font size), it is not clear of its baseline should be from the mid point or from the bottom of the left stroke.

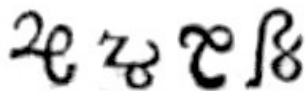


Figure 7.1. Cossic symbols in later works by Wallis, use the same form as Masterson 1595, for example Wallis 1695.

The top loop form also resembles some forms of abbreviations for solidus with a superscript sigmoid s when connected with the previous number.

7.b. This character may be considered a variant of long s-s ligature, with the second s being a sigmoid s. In general, that ligature is wavier like in Wallis 1695 but in some hands the wavy line is reduced to a curve.



Figure 7.2. When discussing forms of the abbreviative s, Reusens 1899 (<https://archive.org/details/elmentsdepalogra00reus/page/99/mode/1up>) shows 3 forms of S WITH DIAGONAL STROKE, then a form of MIDDLE SCOTS S looking like long s-sigmoid s and another like long s-round z or long s-et ligature form.

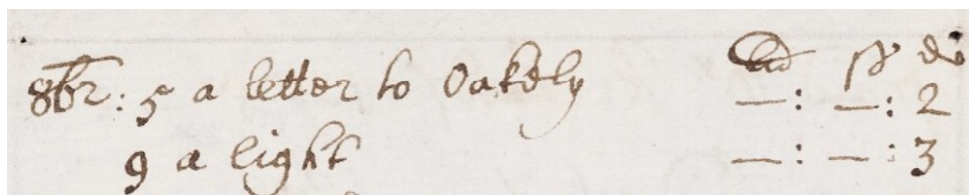


Figure 7.3. Abbreviations of libra, solidus, denarius, with an abbreviative s for solidus in Bodleian Library MS. Locke f. 5 from 1681 (<https://digital.bodleian.ox.ac.uk/objects/0596876f-c497-4ed6-b861-b61797ae4446/surfaces/b201ce3e-3f61-4316-8f43-1b16ca8f9f57/>)

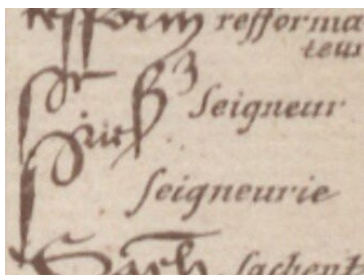


Figure 7.4. Two abbreviations for “Seigneur” and one of “Seigneurie”, in Alphonse Chassant, *Paléographie des chartes et manuscrits du XIe au XVIIe siècle*, 1839, Pl. III (<https://gallica.bnf.fr/ark:/12148/bpt6k936925k/f64.item>).

Philip Beeley, co-author of *The Correspondence of John Wallis*, noted in personal communication that he wasn't yet aware of any instance, where Wallis discusses or employs specific cossic symbols in his correspondence.

This character should not have been added at this point. It's shape is unclear and it may just be a proper glyphic variant.

**Recommendation: Remove this character.**

#### 8. MATHEMATICAL ITALIC LIGATURE LONG S WITH DESCENDER S

It is not clear why either this character is needed or why others mathematical italic characters are not. The mathematical italic is a semantic device that was not yet used in the period of Cossic works, if anything, these symbols were cursive forms (which we would not interpret as italic).

Some works in Latin use single letters in italic as Cossic symbols, including italic long s, but no MATHEMATICAL ITALIC LONG S is being proposed.

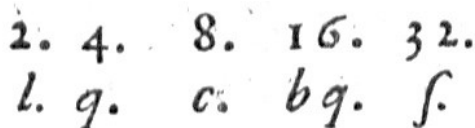


Figure 8.1. Italic long s in Petrus Ramus, *Arithmetices Libri Duo et Algebrae Totidem*, 1592.

In some works the German Cossic symbols may be interpreted as being italic, but their MATHEMATICAL ITALIC forms are not being proposed.

**Recommendation: Remove this character?**

## 9. Kurrent style of MATHEMATICAL SCRIPT SMALL Z

9.a. As the other Cossic characters, this should be analysed as a base letter with an abbreviative stroke or loop. It seems the abbreviative stroke is reduced to a crossing loop which make the symbol similar to a cursive z.

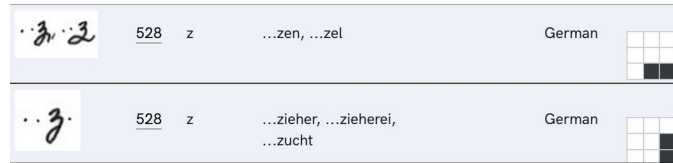


Figure 9.1. The Cappellin Online project shows some forms of abbreviative script z <https://www.adfontes.uzh.ch/en/ressourcen/abkuerzungen/cappelli-online?characters=z&category=&transcription=&language=german>.

In some works, the form of the symbol is clearly composed with an abbreviative stroke or loop:

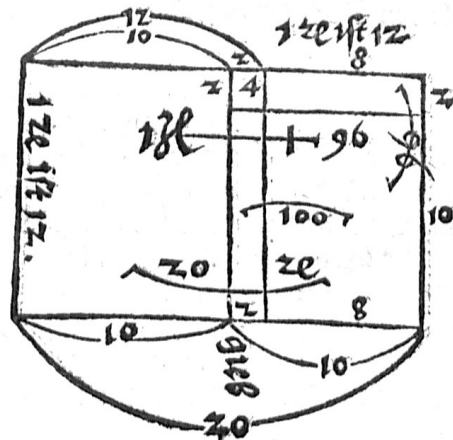


Figure 9.2. Anton Schultze, *Arithmetica oder Rechenbuch*, 1600.



Figure 9.3. Cossic symbols in back pages of Augsburg, Staats- und Stadtbibliothek -- Math 740, Christoff Rudolff, *Behend vnnnd Hübsch Rechnung*, 1525.

Arab:	Griec:	Latin:	d'Onse.	
—	αεβμς	N—	①	2
□	—δ <sup>v</sup>	Q—	②	4
■	—x <sup>v</sup>	C—	③	8
▒	—δδ <sup>v</sup>	QQ—	④	16
▓	—δx <sup>v</sup>	QC—	⑤	32
▔	—δc	QQQ—	⑥	64
▕	—	QQC—	⑦	128

Ende soo voort oneyndigh.

Figure 9.4. Jan Jansz Stampioen, Algebra Ofte Nieuwe Stel-Regel, 1639:

9.b. It is not clear why the form called "Latinized" in the proposal (see also Masterson 1595 or Wallis 1695 above) is not considered a distinct symbol while that is done for the LONG S WITH TOP LOOP.

There should be a character LATIN SMALL LETTER SCRIPT Z WITH LOOP. Unlike LATIN SMALL LETTER EZH WITH CURL, the top can be round and the loop ends with a long upward stroke.

**Recommendation: Remove the sequence?**

**At a later point, a separate proposal can be made for LATIN SMALL LETTER SCRIPT Z WITH LOOP.**