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Tablet *Keiti* and calendar-like structures in Rapanui script

by

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To Igor Pozdniakov, father and coauthor

What does it mean to describe the structure of the text for Rapa Nui script?

To my opinion, this question deserves a detailed answer in light of recent publication of two papers (Melka, 2008; Wieczorek, 2011) that discuss actively the "structure" of tablet Keiti (text E in Barthel's nomenclature). In addition to these, a detailed palaeographic study of the tablet was published by Horley (2010). Thus, text E was quite lucky (in contrast to the original tablet, which perished in the fires of the First World War) to be the subject of three research papers, and even a chapter of a monograph (de Laat, 2009). In all known rongorongo corpus, perhaps only tablet *Mamari* and *Santiago staff* were honored with such concentrated attention of the scholars. Such an arduous discussion about text E, to my opinion, was triggered by Melka's paper. From semiotics we know that one of the main functions of the text is to generate other texts. The polemics concerning the tablet Keiti makes a good illustration of this idea: today, if a scholar working in rongorongo field does not express an opinion about text E, it may be considered as bad manners. Fulfilling the "requirement" to write a paper about this particular inscription, I would like to use this opportunity to define the principal bases for structural analysis of Rapa Nui script in general, to outline the minimum criteria that should be met for any scholarly description of text structure, and finally, to emphasize the importance of proper structural analysis, which can be extremely useful for a potential deciphering.

To catch up with modern trends in rongorongo studies, it was decided to dedicate a special attention to a popular question about the potential calendars in the Rapa Nui script, which became the focus of two other papers published in this issue (Wieczorek, 2011; Horley, 2011).

The structure of *rongorongo* inscription

Can we judge about the structure of the text, if we can't read it? The text is composed of signs that can be grouped into a sign catalogue. If the things were that simple, the question would be much easier to solve. The problem is that today we don't have any widely-accepted catalogue, which means that the unified version of text E is nonexistent. According to Barthel (1958), text E has 880 signs, according to Horley (2005)–982, according to Pozdniakov-Pozdniakov (2007), there are 1115 signs. Barthel's catalogue includes over 500 different signs. At the modern state of knowledge, it seems incorrect to call it a catalogue – perhaps, rather a first approximation of a catalogue – because it contains so many duplicated glyphs, allographs and ligatures that definitely should not be there. The interested reader is advised to read Guy (2006) for a critical review.

Both Melka and Wieczorek are working with Barthel's catalogue, *knowing* that it is heavily flawed. Why one cannot simply remove ligatures and allographs from Barthel's catalogue? Well, because no people are working in this field of

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rongorongo studies – I don't know any publication dedicated to the systematical improvement of Barthel's catalogue, while there are dozens of publications with "final and complete decipherment " of *rongorongo*. The papers by Melka and Wieczorek are no exception – they are based on Barthel's catalogue for the want of any better sign list. The problem here is that to distill a real catalogue, one should make – manually, on pre-computer stage – a very complicated and painstaking work on comparison of known parallel texts (H/P/Q and Gr/K), as well as almost a hundred of parallel fragments, which again never appeared in a systematic publication (this important lacuna is partially filled by the Appendix 3 of this paper). And this may be the *only* way to separate the meaningful and non-meaningful variations of the graphemes, finally arriving to a formal structural analysis of *rongorongo* texts. To the contrary to Barthel's sign list, our catalogue Pozdniakov-Pozdniakov (2007) has been thoroughly filtered, and now it contains only several dozens of confirmed independent signs (see Appendix 1). Therefore, looking on the same inscription, we actually study *different* transliterated texts that naturally have different text structures.

Another important question: let us imagine that we finally came to an agreement about the sign catalogue and paved the way to the studies of text structure, and, in particular, for the structure of text E. In accordance with the papers published on the topic, I think it is imperative to consider two principal points.

The first: Yuri Knorozov, who proposed a possible genealogy in Gv, already *knew* in the 1950s that text E features ten occurrences of the same fragment with small variations (Butinov and Knorozov 1957: 10): "Text VII (*Keiti*) has a row of the initial double combination of the signs of the earth and the rat" – which are nothing else than glyphic groups 4.430-22.380, mentioned by Melka as "sequence beta". How it comes that in 21st century Wieczorek writes the following:

«In a recent article, Melka (2008) put tablet *Keiti*... under careful structural analysis. He identified three types of glyphic sequences that repeat several times in the *recto* side of the tablet, which were earlier independently retrieved by Sproat (2003) and Horley (2007: 26). However, Melka (2008) submitted them to more dedicated study, and named each one of them; sequence alpha 1-10, sequence beta 1-7 and sequence gamma 1-10 according to the number of times they are repeated on the tablet.»?

This is a serious problem, which cannot remain unnoticed, at least because of required honors to the memory of professionals working in *rongorongo* field. I think that everyone of them knew about these ten fragments of text E; they also knew, for example, that in the inscription of the famous *Santiago staff* (text I according to Barthel) the signs can be grouped in graphical triads (we were discussing these triads with Fischer and Barthel in Leningrad many years before the publication of Fischer's "discovery"). There are *hundreds* of such particular observations in collections of every specialist, which does not make it ready for publication for the simple reason that a publisher would rather accept the next sensational decipherment rather than a paper with a detailed structural observations without any "cosmic" conclusions.

The second: Wieczorek's paper uses many times the words "structural analysis". He believes that Melka presented the detailed structural analysis of the text E and made several important discoveries; now, it's Wieczorek's turn to improve the work of his forerunner by discovering new structural properties characteristic to this inscription. Actually, both Melka and Wieczorek reduce the structural analysis to the study of ten widely known repetitive fragments "alpha-beta-gamma" (here I use their terminology to facilitate discussion) and ten fragments "beta" repeated separately. Apart from this, the authors point to the obvious and well-known (since 19th century) frequent occurrence of sign combination 380.1 (see Harrison, 1873: 379):

«In the four middle lines (of tablet G, *recto* side)... the signs are arranged in compartments or paragraphs, each of which commences (or ends) with the sitting figure of a negrito holding a staff...there are in all thirty-one of these figures, and consequently the same number of compartments.»

Grounding their own analysis on these "discoveries", Melka and Wieczorek propose the hypothesis that the texts on *recto* and *verso* sides of tablet E are different, allowing Wieczorek to exclude *verso* side from his analysis. These are practically all the observations about the structure of the text E, to say nothing about incomprehensible comments about the sequence "beta" on the recto side of the tablet.

Apart from the aforementioned problem with a use of different glyph catalogues, it is difficult to accept Wieczorek's analysis of the fragments "alpha", "beta" and especially "gamma" because the proposed description of the *structure* is unacceptably simplified (this will be discussed in more detail below). To my opinion, the structure analysis of *rongorongo* text, including text E, *should* contain at least the following aspects:

There are many sign sequences frequently repeated in different texts. Text E is no exception, the sequences "alpha", "beta" and "gamma" should be analyzed (what is partially done by Wieczorek), but, to reiterate, this could be done only by basing oneself on the firm catalogue, where meaningful differences would be separated from insignificant ones and freed from ligatures

and numerous allographs (the key issues causing serious problems with Barthel's catalogue).

The texts may "favor" certain signs. The same sign is more frequent in some inscriptions and virtually disappears from the others. There also exist atypically rare signs. Text E is no exception to this, featuring very frequent sign 63 in four initial lines of Er. To discuss the frequency of occurrence for each sign, it is insufficient to publish a catalog different from Barthel's – it is necessary to perform a clear transliteration showing how exactly each Barthel's sign recodes in each particular place. The detailed description of this point goes far beyond the format of a paper. Therefore, I will only make a complete re-coding of text E to our catalogue without detailed argumentation in Appendix 2. In each particular case I am willing to present the supporting evidence confirming re-coding of each particular glyph. These arguments are based on the detailed analysis (on a pre-computer stage) of sign use in the parallel texts (H=P=Q, Gr=K) and dozens of parallel fragments.

Regular use of two different (according to Barthel) signs in the same context (the same position in parallel texts or parallel fragments) was used to declare two Barthel's signs as allographs of the same sign. Similarly, one can be sure that a common ligature should be split if in the same context it appears in joint writing in one text, while it is represented by separate signs on another tablet.

The second strong criterion in favour of meaningful separation of the ligatures concerns sign collocation. I will repeat the example from our previous publication. How will respond the frequency of sign collocation to separation of letters Q and R into "ligatures" "O\" and "P\"? The "excessive" backslash sign "\" will be quite frequent, but it will combine **only** with two signs – O and P, which will "overload" all the possible limits for collocations of the "normal" signs. Due to this criterion, we restrained from further splitting the signs 240, 380, 91 and 99. Theoretically, one can see sign 99 as a ligature 14+200 (also 91 as 62+280), but these glyphic components will occur so frequently in these exclusive combinations that it will be inconceivable to suggest that they represent separate signs.

The structure of the text is not merely defined by the repetitive fragments within it and the characteristics of particular signs, but also by parallel fragments shared with other inscriptions. Tablet *Keiti* is common in this sense – considerably long sign sequences from text E can be found in the other texts, sometimes on a single tablet and sometimes on most of them. Such parallel fragments can be composed from 5 or 6 signs, but some of them may have scores of glyphs. Alas, it is impossible to present all discovered parallel fragments in a single paper – it can be possible only in monographic publication. However, as this paper focuses on text E, I decided to present here 20 parallel fragments from this text, which are listed in Appendix 3 as they appear. Publication of these fragments, to my opinion, is a priority for improving future studies of Rapa Nui script.

In each *rongorongo* text one can found passages (sometimes several lines long) that do not occur anywhere else except in a single text. These sign sequences should also be highlighted in the structural analysis.

Some text passages of Rapa Nui script has a particular structure, in which the text is divided in very short segments by regularly combining two or three signs, for example, the combination 380.1. Text E is also common in this sense, with its lines Ev1-Ev5 organized just in this way. Jacques Guy called them "harmonic sequences" (2006: 59). I will rather use here the terminology proposed by Yuri Knorozov, who called the sign groups bracketed with delimiters as "blocks", and the whole sequence forming "block sequences".

The composition of the aforementioned five factors determines, to my opinion, the *structure* of *rongorongo* text. Comparing the distribution of repetitive sign fragments, clusterings of particular signs, sequence and distribution of the fragments appearing in several texts, the "voids" filled by the unique sign combinations, block sequences and graphical delimiters standing between them, we will obtain full description of general structure of the text, which then can be compared with structure of the other texts.

Analysis of text E structure performed by Wieczorek is mainly limited to the first point only. Additionally, to my opinion, the definition of repetitive fragments of Er requires significant improvement. In this paper I will describe the structure of text E as a whole. Taking into account the fact that Wieczorek discovered a calendar in text E (the most fashionable topic in Rapa Nui studies!) I will dedicate a special attention to the important problems caused by such interpretations.

Sub-structures "Alpha" and "Beta"

Wieczorek uses slightly modified subdivision scheme suggested by Melka, defining three repetitive segments that occur ten times in Er: the "sequence alpha-beta: composed of glyphs 300.028x-004.430-022.430y", as well as "the final sub-sequence alpha-gamma: composed solely of an athropomorphic glyph with various suffixes" (Wieczorek 2011). However, in his table 3 entitled "Sequence gamma 1-10", Wieczorek

TABLE 1

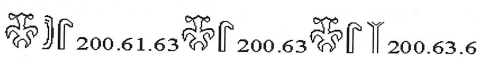
crescent orientation				alpha-alpha					alpha-beta							alpha-gamma			
1	Er01	R	**L**		41	200	41	200	200	28	4	10	400	22	380	200	6	63	
2	Er01	R	R		41	200	41	200	200	28	4	10	400	22	380	200	61	63	
3	Er01	R	R		41		41		200	28	4	10	400	**41**		200		63	**10**
4	Er02	**L**	R		41	200	41		200	28	4	10	400	22	380	200		63	**6**
5	Er02	R	R		41	200	41		200	28	4	**6**	**200**	**41**	380	200		63	
6	Er02	R	R		41		41		200	28	4			41		200		63	
7	Er03	**L**	R		41		41		200	28	4	**6**	**200**	22	380	200		63	
8	Er03	**L**	**L**		41		41		200	28	4	**6**	400	22	380	200		63	
9	Er04	R	R	**380**	41	200	41		200	28	4	10	400	22		200	59	63	
1b	Er04										4	10	400	22	380				
2b	Er05										4	10	400	22	380				
3b	Er05										4	10	400	22	**660**				
4b	Er06										4		400	22	380				
10	Er06	R	R		41		41		200	28	4	10	400	22	380	200	6	**44**	
5b	Er07										4	10	400	22	380				
6b	Er08										4	10	400	22	380				
7b	Er08										4	10	400	22	380				
8b	Er08										4	10	400	22	380				
9b	Er08										4	**6**	**660**	22	380				
10b	Er09										4	**6**	**660**	22	380				

presents sequences 004.430-022.430y, which are interpreted in the text as "alpha-beta". Naturally, this issue does not facilitate the discussion. Barthel's transliteration of the fragments 1-10 can be found in Wieczorek's table 1; the transliteration of the same segments to our catalogue (Pozdniakov-Pozdniakov) is given below.

Apart from sign codes used, the most pronounced difference between the data in table 1 and the table from Wieczorek's paper concerns inclusion of the signs 63 into segments "alpha-gamma". Wieczorek says that sequences "alpha-gamma" are "composed solely of an athropomorphic glyph with various suffixes", excluding sign 63 from the segment. This result is the consequence of using Barthel's transliteration, which for the segments 1, 2 and 9 shows sign 63, while segments 3-8 feature glyphs 203 or 203s that actually have sign 63 included. As it may be confusing for the reader, here are the glyphs from the first three sequences "alpha-gamma" accompanied with Barthel's and Pozdniakovs' encoding:

(Barthel):

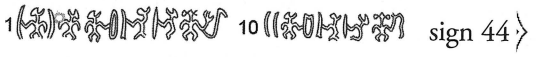
(Pozdniakov-Pozdniakov):



In this way it becomes clear that sequence "alpha-gamma" does not go with whatever athropomorphic glyph, but with the *same* sign 200 in all ten cases.

I would like to emphasize that the signs were interpreted as ligatures in our transliteration because of criterion independent on text E: there are many examples in *rongorongo* corpus showing regular correspondence of sign 203 to the combination 200.63, proving the necessity to separate a ligature and exclude sign 203 from the catalogue.

Importantly, the last sign closing the segments 1-10 is unusual. The final ligature (204.077 in Barthel's transliteration) transcribes as 200.6.44 in our catalogue (with somewhat questionable identification of glyph 44).



Perhaps, we are dealing here with a "marker glyph" signaling the closure of a homogeneous set of segments, so that the last sign can actually be downward-pointing "adze" glyph 63. As we know from the statistical studies, anthropomorphic signs "prefer" facing to the right with their hands raised. But in some cases these glyphs "turn" to the left and their hands are depicted dangling. The exact function of these deviations is not known. I would like to suggest a hypothesis based on dozens of examples (the discussion of which goes beyond

the scope of this paper): the deviation from the standard orientation of the signs may have a special "marker" function signaling the beginning/ending of a complete textual passage.

This assumption is directly related to the crescent sign 41 that appear in every segment 1-10, facing either to right ⟨ (R) or left ⟩ (L). Barthel treats these as separate signs with codes 040 and 041, respectively. For Wieczorek these crescents are *principally* distinct – he builds up his entire calendar hypothesis on their difference. However, the dozens of examples signals the regular correspondence of both R- and L-crescents, and the general regularities connected with uncommon orientation of other signs do not allow to suggest any phonetic function for this pair of glyphs. The number of "uncommon" crescents marked with letter "L" in Table 1 approximately corresponds to the fraction of other L-oriented signs in the entire corpus, comprise a definitive minority. For ten pairs of crescents entering alpha-alpha sequences, the first one flips to the left only in three occasions, while the second one features only two L-oriented forms. In one curious instance (8th sequence "alpha-alpha"), both crescents are turned to the left.

A special attention should be paid to the sign 380 in the sequences "alpha-beta". It is absent from three segments (3rd, 6th and 9th). However, it is imperative to remember that both 3rd and 6th segments are located close to the end of the line, where the scribe might have involved abbreviated writing to save some valuable space. The 9th segment actually has sign 380, but it opens the sequence "alpha-alpha"/"alpha-beta" instead of closing it. One possible explanation of this anomaly will be given below. The sub-structure of the sequences is also interesting – in particular, the 5th and 7th segments "alpha-beta" features combination with X-shaped base 6.200 (5) and (7) in place of the expected 10.400. In 8th the bird head is added to the second sign, resulting in a combination 6.400 . Sub-structure "beta" features a good overall homogeneity with the only exception of segment 4b lacking sign 10, and two last segments 9b-10b featuring a ligature combination 6.660 in place of usual 10.400 .

Statistics

One can choose among a significant number of statistical characteristics to study *rongorongo* (Pozdniakov-Pozdniakov 2007). Here we will consider the most important of these – the overall occurrence frequency of the signs. Let us compare sign frequencies in text E with average ones for the reference corpus (Cor) formed with inscriptions of the tablets A, B, C, E, G/K, H/P/Q, N, R, and S. Text E in our transliteration contains 1,155 signs, while the reference corpus is composed of 12,414 sings, Table 2 presents glyph list sorted over their occurrence frequency in the reference corpus.

Text E in comparison features a much lower number of glyphs 3, 62, 61, 400, 8, 66 and 2 in comparison to that of the reference corpus. At the same time, the inscription of *Keiti* definitely "favors" the signs 63, 22, 10, 380, 1, 200, 280 and 28. The positive deviation of occurrence frequencies for these glyphs is understandable – especially for signs 380 and 28 entering the fragments "alpha/beta".

TABLE 2

	Cor	E		Cor	E		Cor	E		Cor	E		Cor	E
sign	%	%	sign	%	%	sign	%	%	sign	%	%	sign	%	%
6	9.9	9.2	**700**	2.6	2.4	**730**	1.3	1.6	**99**	0.7	0.7	**28**	0.3	1.0
200	8.4	9.3	**4**	2.6	3.0	**901**	1.3	1.5	**76**	0.7	0.4	**71**	0.3	0.8
10	6.6	8.7	**41**	2.5	3.1	**95**	1.2	0.8	**45**	0.7	0.7	**999**	0.3	0.0
400	5.9	4.8	**660**	2.3	2.4	**44**	1.2	1.5	**60**	0.7	0.2	**91**	0.3	0.3
1	5.6	7.1	**22**	2.0	4.2	**7**	1.0	0.9	**67**	0.6	0.5	**25**	0.2	0.1
3	5.4	2.9	**9**	1.8	1.7	**34**	1.0	1.3	**53**	0.5	0.9	**15**	0.2	0.0
2	4.1	3.2	**63**	1.7	4.1	**69**	0.9	0.4	**52**	0.5	0.0	**720**	0.2	0.2
62	4.0	2.3	**240**	1.6	1.1	**48**	0.8	0.6	**74**	0.5	0.2	**530**	0.1	0.0
380	3.2	4.8	**5**	1.6	1.6	**70**	0.8	0.6	**16**	0.4	0.3	**14**	0.1	0.0
61	3.2	2.0	**8**	1.6	0.7	**59**	0.8	0.3	**27**	0.4	0.2			
280	3.0	3.8	**66**	1.4	0.5	**50**	0.7	0.7	**38**	0.3	0.3			

But even the presence of ten sequences "alpha" spotting adze glyph 63 does not explain its exceptional frequent occurrence in text E, which is more than twice higher than in the reference corpus. The actual problem is even deeper – the distribution of the sign 63 within *Keiti* inscription is very heterogeneous. Out of 47 occurrences, 42 appear on *recto* side and only 5 on *verso* side. Therefore, if we aim to describe the structure of the text E, we should also consider this anomalously high concentration of sign 63 literally "peppering" the short passage of Er.

Parallels between Keiti *inscription and other inscribed artifacts*

As mentioned before, the text E contains at least 20 fragments shared with other *rongorongo* inscriptions (these are listed in Appendix 3 and referenced as F.1–F.20 in their occurrence order). It is important that in many cases, apart from sharing individual fragments, *rongorongo* inscriptions feature complete sequences thereof. Detailed comparison of these sequences (which by itself would deserve a separate publication) will pave the way for reconstructing the most stable "texts within the texts", allowing to classify the texts that have survived in Rapa Nui script.

"Block sequences" and text structure

The side-by-side illustration of two parallel sequences of blocks appearing on tablets Gr and K is illustrated in Appendix 4. These textual fragments actually appear in many texts, using different delimiters between the blocks – in general, it is sign combination 380.1  , but there also exist modified versions  (),  (), as well as other sign combinations  .

The most frequent glyphs appearing in block delimiters are 380, 1, 3, 52, 5, 9, and 66. I will consider these delimiter combinations more in detail further in this paper.

Calendar-like structures

Wieczorek's calendar interpretation of a fragment from text E does not convince me. I agree completely with the arguments of Horley (2011), who says that L-turned glyphs (which otherwise are known in their predominant R-turned forms) are quite frequent, so that the phenomena is not restricted to crescent signs. The uncommon glyph orientation can be found in many signs, and these can easily be found in the passages that preclude any reference to calendar topic. Moreover, the different orientation of the signs is noted in many parallel fragments. The examples shown by Horley can be easily expanded, but even those illustrated are enough to postulate that unusual sign orientation is not phonetically meaningful. Instead, it may have some complementary function, which is unknown to us – perhaps, that of "mini-texts" delimiter. Therefore, Wieczorek's appeal that the word *kokore* (which is used in the names of several moon nights) means 'without' is far from convincing. In the fragment of text C which, according to the majority of the specialists, contains a lunar calendar of some kind, there are four fish signs in the first part of the calendar inscription (corresponding to the rising moon phase), which are oriented head-up – the usual way the fish glyphs are seen in *rongorongo* script (a special case of a fish sign incised on an edge of the tablet is discussed in Horley 2009: 255). Four fish signs for the second part of the calendar (denoting the setting moon) use the uncommon head-down orientation. This particular usage of fish glyphs constitutes the strongest difference between the delimiter groups of the calendar. In this example it is obvious that the uncommon orientation of the sign is connected to iconic (but not phonetic) function. Moreover, this distinct head orientation of fish sign, acting as a marker for two halves of lunar month offers the main supporting argument for identifying lines Ca6-Ca9 with a calendar inscription.

The name kokore

Let us consider the problem of the word *kokore*, used for the names of several lunar nights, in conjunction with a potentially iconic interpretation of fish signs appearing in calendar inscription. Could it be that the orientation of fish signs characterizes *only* the notions for the rising / setting moon? It is accepted that the occurrence of the word *kokore* (translated as 'without') in the names of the nights of Eastern Polynesian languages can be explained by "namelessness" of these nights (as, for example, the name of the ring finger in Russian is "*bezym'annyj*", which literally means "nameless"). Is it really so?

In the classic paper by Stimson about the names of lunar nights recorded in Tahiti, there are unique data about the connection of each night with concepts of fishing and fertility. Stimson says that there are nights when fishing is easy (because the fish rises up to the surface), and there are nights when fishing is useless (the fish goes to the depth). In some nights it is acceptable to fish, but in some nights it is pro-

TABLE 3

	Night name	Fish	Fishing outcome	Favorability	Fishing permission	Miscellaneous comments
1	*Tirio*	has risen	many fish			
2	*Hiro-hiti*	has risen				Hiro was born
3	*Hooata*	has risen				
4	*Hamiama-mua*	has risen		most favorable		
5	*Hamiama-roto*	has risen		most favorable		
6	*Hamiama-muri*	has risen		most favorable		
7	***ore'ore-mua***	disappears				
8	***ore'ore-muri***	disappears	fishless			fish copulate
9	*tamatea*	has risen	fishless			fish copulate
10	*huna*		fishless, fish asleep, eyes closed		do not fish	
11	*rapu*		fishless			
12	*maharu*		very fishless		do not fish	
13	*hu'a*		many fish			
14	*maaitu*			favorable for planting		
15	*hotu*		many fish	most favorable for planting		large-eyed children are born
16	*maara'i*		many fish	favorable for planting		
17	*turu*				do not fish	beautiful children are born, fecundation
18	*araa'aau-mua*	disappears	fishless		do not fish	
19	*araa'aau-muri*		fishless		do not fish	
20	*araa'aau-roto*		fishless			
21	***ore'ore-mua***	disappears	fishless			
22	***ore'ore-roto***	disappears	very fishless			
23	***ore'ore-muri***	disappears	fishless			
24	*taa'aaroa-mua*		abundant fish			
25	*taa'aaroa-roto*		many fish			
26	*taa'aaroa-muri*		many fish			
27	*taane*		many fish	favorable for planting food-plants in the soil		man embraces woman
28	*ro'oo-nui*		many fish	favorable for planting food-plants in the soil		
29	*ro'oo-maauri*	disappears	many fish in some months			
30	*maairi-mate*	dissapears (sleeps)	very fishless			

hibited (and this attribute not necessarily coincides with fish accessibility: sometimes fishing is prohibited when the fish is readily available; in other days it is possible to go fishing, but the fish roams deeply and is difficult to catch). Let us generalize Stimson's data (Table 3).

According to this author, after the full moon and before the end of the month the fish goes to the deep. In the waxing moon, the fish goes up except for the 7th and 8th nights, when it disappears. Importantly, only *these* two nights in the waxing moon part of the calendar are called *ore'ore* (which corresponds to Rapanui *kokore*). In the waning moon part of the month, the name *ore'ore* appears for the nights 21-23, for which fish also disappears. Could it be that the word *kokore* 'without', usually interpreted as "nameless", actually means "fishless"?

As one can see, the data of the column "fishing outcome" does not coincide with the data in the column "fish" – the former has more frequent oscillations. There are many fishes in nights 13-16/17, and then in the end of the month (nights 25-28/29). The fish is scarce on the nights 8-12 (opening with two *ore'ore*), nights 18-23 (ending with three *ore'ore* nights), and in the last 30th night *maari-mate*, 'the death of the Moon' (Stimson). The full moon, to the contrary, is very favorable for many things: the fish abounds, the planting is successful and large-eyed children are born.

To my opinion, it is extremely important that fishing is tightly bound to the calendar, and the presence of fish signs "swimming" up and down in eight delimiter fragments of the Mamari calendar can be directly related with the concepts of fish and fishing.

Speaking about the perspectives to find other calendars in *rongorongo*, Horley (2011) says: "Therefore, while it is completely reasonable to expect that Easter Island tablets may contain references to individual lunar nights / month names, it seems that the crescent series appearing in lines Ca6-9 of tablet Mamari form the only complete lunar calendar in the survived *rongorongo* corpus". I think that this statement is open for discussion. Below I will show that there are several unusual segments that feature many similar characteristics with the famous calendar inscription of tablet *Mamari*.

Calendar in Ca5-9 and ... in Er1-Er3?

First of all, let us study a schematic chart of lines Ca5-Ca9 (Fig. 1), which allows easy comparison with another potential calendar fragment. The question about the exact number of nights appearing in this list is still open for discussion. I think that one should count at least 31 nights (28+3) numbered in the figure. The ligature 1.6 serves as a "graphical frame" – the "forward" form 1.6 opens it and the "mirrored" form 6.1 closes the calendar.

Letters **x** in Fig. 1 denote sequences of glyphs not shown here for the sake of presentation clarity. The single letters **x** stands for of about 10 signs long.

Perhaps, there are reasons for talking about separate framing of 28-night (four weeks?) cycle, marked with a glyph combination (and that's why I think that the boundaries of the calendar inscription should be expanded to include the line Ca5. Three signs 41 for the nights 29-31 (in line Ca9) belong to a stable fragment appearing on several tablets (Figure 2).

FIGURE 1

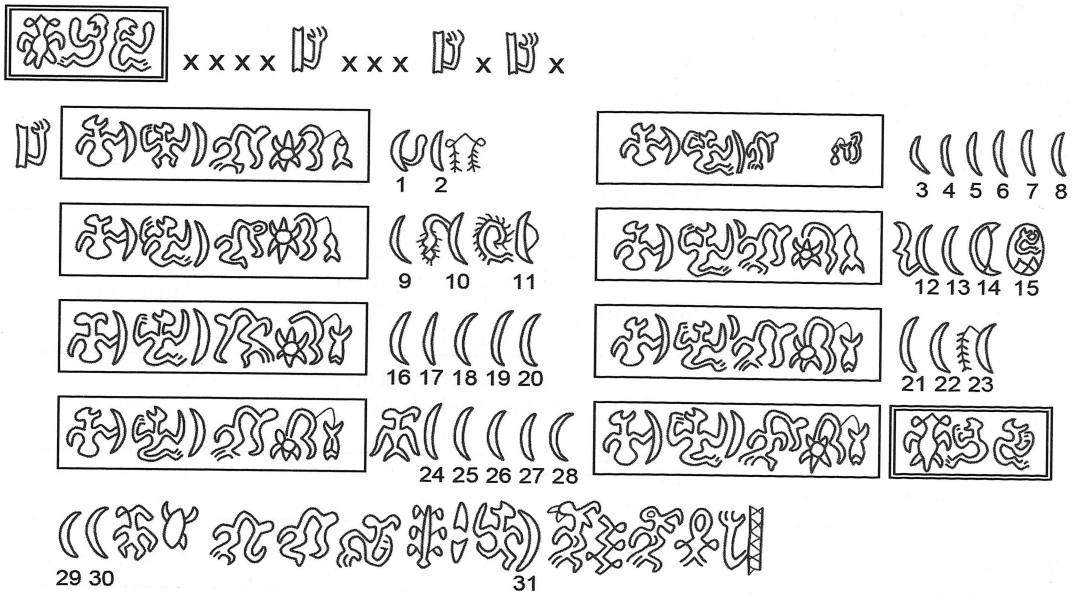
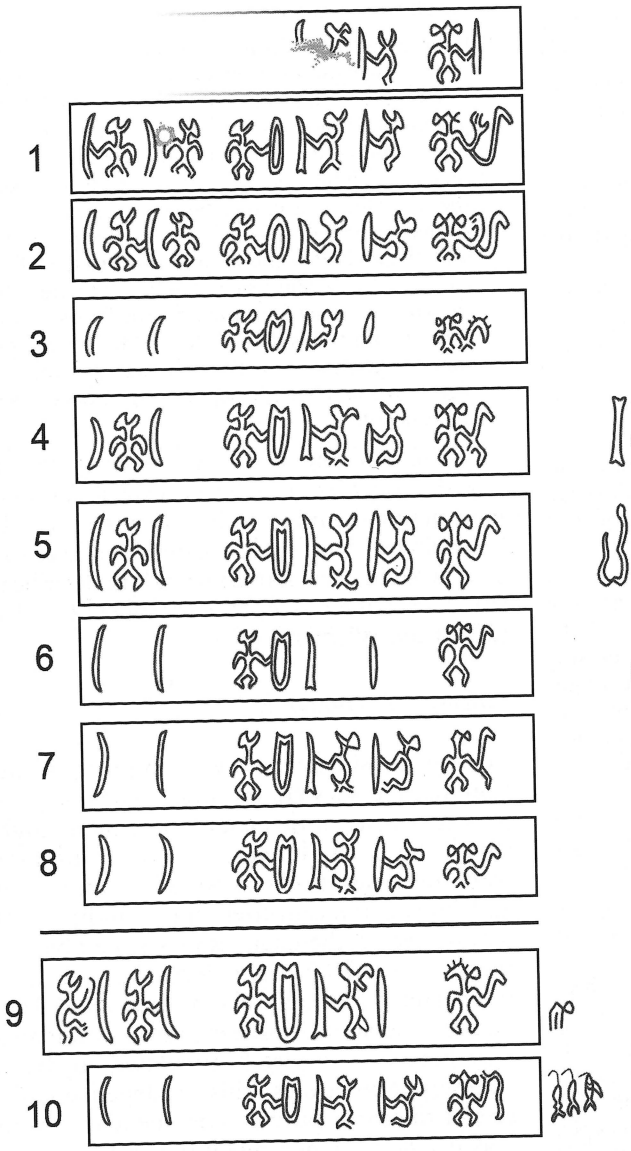
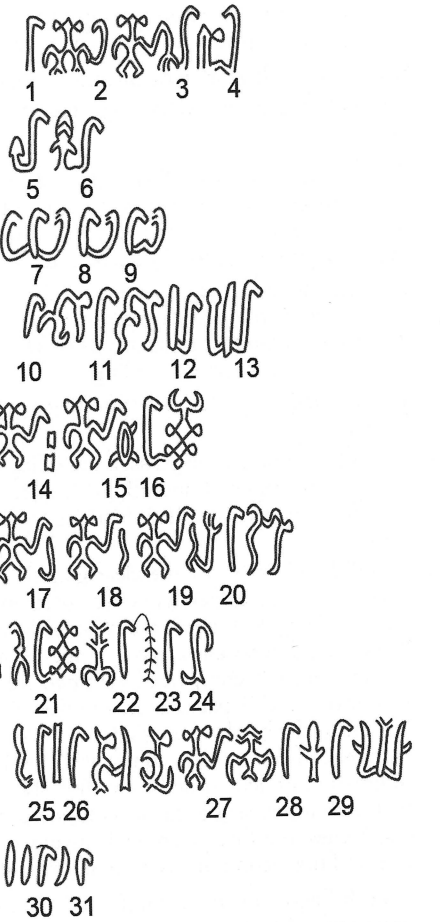


FIGURE 2

FIGURE 3





Now let us return to the tablet *Keiti*. I think that it is a much better candidate for the calendar than the sequences "alpha-alpha studied by Wieczorek. Curiously, this potential "calendar" fragment (Fig. 3) appears within the lines Er1-Er3 analyzed by Wieczorek.

The figure shows eight fragments "alpha". Why only eight out of ten? Because only these fragments written in lines Er1-Er3 enclose the tight grouping of sign 63, which becomes considerably rare in the rest of the tablet. The figure numbers 31 occurrences of the "adze" signs, omitting those belonging to delimiter sequences "alpha" (in a similar way, we do not count the crescent signs appearing in delimiter sequences of *Mamari* calendar).

Let us consider first the structural differences between Er1-Er3 and Ca5-Ca9:

1) Text C features clearly ideographic calendar signs – the crescents are recognizably moon-like; text E uses completely different sign 63 and there is no straightforward evidence to consider it similar (or related) to the crescent glyph 41.
2) Text C uses ideographic fish sign that changes its orientation for the moon-waxing and moon-waning part of the month; nothing similar appears in text E.

Now, let us list structural similarities between these two fragments, which are too numerous to be ignored:

1) In both cases we are dealing with very common *rongorongo* signs appearing in every survived text; these glyphs also appear in contexts that clearly do not have a slightest relation to calendar texts.
2) At the same time, the occurrence of the signs 41 and 63 in aforementioned passages of Mamari and Keiti tablets is so high that it practically precludes the possibility of their phonetic reading.
3) In both fragments the corresponding sign occurs 31 times.
4) In both fragments the passage including 31 occurrences of the signs 41 and 63 is delimited with eight glyphic sequences – perhaps forming 8 parts of lunar month?
5) It is difficult to escape the clear graphic similarities between the delimiter sequences used in the both texts –  (line Ca6) and  (line Er1). They include two anthropomorphic signs showing head in profile accompanied with two crescent signs that form ABAB pattern. In the first delimiter of both texts the heads of the signs are looking towards each other, because the second glyph 300 is depicted in uncommon left-turned form. It is also important that both initial sequences are composed from three graphemes: the first glyph 41 is included into ligature and the second one is written separately.
6) In both fragments the key sign that repeats itself 31 times enters into corresponding delimiters: there are two crescents 41 in each calendar delimiter of text C and one "adze" 63 closing every sequence alpha.
7) In both texts the 15th – and 14th – signs are clearly iconic. The 15th sign in *Mamari* calendar depicts the full moon and is directly related to the corresponding lunar phase (see Horley 2011, Fig. 9); the 14th sign there can be interpreted as intended to depict almost full moon. Text E features glyph  after 15th occurrence of sign 63, which also may have an iconic interpretation as a full moon. In the 14th position there is glyph 16 depicting two halves of a whole (). In the text E the first night of the waxing moon is marked by an uncommon left turn of the sign 63  . In the same way, the delimiter group following the full moon in Mamari calendar includes the bird sign 631 turned to the left (Guy 1990: 141).
8) Text C features sign  3 before the 23rd crescent. In our calendar-like structure of text E this glyph appears only once, following 22nd occurrence of the adze glyph!
9) Thirty-one "calendar signs" in both texts are divided by the formal markers into the structures 28+3 or 29+2, that is, four-week cycle and the "moonless nights". In the text C the 28-night cycle is set among eight delimiters (Figure 1); moreover, these nights are framed by the glyph sequence  . In text E the signs for the nights 30-31 are written smaller in comparison with the others (an iconic way to approximate 29.5 nights of the lunar month?). After the 29th adze sign there is a rare grapheme 71.66.71 that will be discussed below.
10) The eight fragments from *Mamari* calendar is divisible in two groups (halves of the month) by orientation of the fish glyph. In text E four first delimiter groups ("alpha-alpha") distinguish themselves by orientation of the crescent sign. Namely in the 4th sequence "alpha-alpha" the first crescent is turned to the left, while in the three previous sequences it was turned to the right. Namely in the 8th sequence (and only there!) both signs 41 are turned to the left. Let us note that in the text C the last 31st crescent is the only one rotated to the left. The 9th sequence in *Keiti* inscription is special due to the unique position of sign 380 – it is the only example where this sign opens block "alpha-alpha – alpha-beta" instead of closing it.

I am completely aware that some of the discussed properties may be occasional. However, in analyzing them in totality, one is convinced to be dealing with ordered structures that have to be considered in detail if one pretends to describe the structure of the text E, as it is claimed by Melka (2008) and Wieczorek (2011).

Calendar structure in Ev7?

Let us consider first a very important question (also discussed in other *rongorongo* papers appearing in this issue): how many nights should be in the lunar calendar? From an astronomical point of view the answer is obvious and known for centuries: the synodic month (connected to the changes of visible phases of the moon) is 29.5 nights long. For the cultural calendar there is no (and *can not be*) any definitive answer. Moreover, cultural calendars may become completely unrelated to the astronomy. Sometimes, this "independence" is one of the main purposes of calendar creation – as it was in French revolution calendar with its year composed by ten months, each month composed by ten days, each day by ten hours; another example is the 1919 Soviet calendar with its five-day weeks. Leaving aside these

exaggerated cases of radical reformations one will nevertheless find out that the most commonly-implemented chronology includes a *dialogue* between the cultural and natural calendars. The possible month lengths are:

28 nights is rather a cultural interpretation than an astronomic one. The underlying idea concerns the possibilities to obtain two equal halves of the month (14 nights), which can be further subdivided in half to get the "classical" week of 7 nights.

29 nights in the month is closer to astronomical reality. It may have place in some cultures, but each culture uses its own way to round the lunar month to an integer number of nights.

30 nights, perhaps, is the ideal mixture of astronomical and cultural interpretations. The number is good for a realistic observable moon cycle and also fits well into cultural requirements – it can be divided into two halves and three equal parts of ten nights each, which looks so natural to human beings using decimal counting system based on ten fingers on both hands. The tripartite month with ten-day weeks is known in China and Polynesia.

31 nights may appear in a written calendar, for example, when one wants to put a graphical emphasis on the calendar embedded into text, creating a visual "frame" by using the same symbol for 1st and 31st night. This iconic approach is especially transparent if 31st sign is mirror-flipped in relation to the first one (the principle which is used in our parenthesis "(...)" that form the very same arrangement as the crescent signs 40 and 41, as well as Spanish "mirror quotation marks" marking direct speech). Namely in this way the 31st crescent (...) in *Mamari* calendar Ca5-9 (Fig. 1) is mirror-flipped in relation to the remaining 30 crescents ((...). If the function of this last uncommonly-oriented crescent consists in creating a visual frame, the calendar with 31 crescents will actually contain 30 nights with its last night corresponding to the first night of a new cycle.

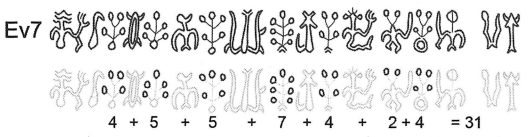
32-night month, alongside with 28-night month, is very attractive due to its high divisibility into halves and quarters. Such month will have four weeks of 8 nights each, which is quite wide-spread in the calendar cycles of the World. Only this variant is subdivisible into eighths composed with an integer number of nights.

Polynesian cultures use *all* the aforementioned possibilities. In the most complete collection of the Tahitian night lists (Roberts, Weko and Clarke 2006) one can find months ranging from 28 to 32 nights. We know that in Rapanui culture there were also different night nomenclatures that are already profusely discussed in the literature (see, for example Horley (2011)).

Therefore, looking for calendar structures in *rongorongo* script, one should pay attention to the anomalously tight grouping of signs in quantities ranging from 28 to 32. It should be desirable to have this sequence of signs divided in half by a specific marker. Most remarkably, one should also expect to see the sequence "framed" with iconic markers denoting the beginning and ending of the calendar. All these properties are characteristic not only of the renowned *Mamari* calendar Ca5-Ca9, but of *Keiti* "calendar" Er1-Er3 as well.

Let us consider the fragment Ev7 (Fig. 4), containing the curious grapheme 71.66.71 , discussed above as marker of the final phases of the visible moon in line Er3.

FIGURE 4



The ligature is situated roughly in the middle of the fragment composed of the floral signs. Let us count the "leaves" on the six signs 34: there are 14 leaves before the ligature (4+5+5) and 15 after it (7+4+4). The second half-month can be augmented with two "leaves" drawn in place of the head of an anthropomorphic sign , making 31 leaves in total (14+15+2). The ligature 71.66.71 divides the would-be "month" approximately in half (if we consider 29+2 nights); the accuracy of division is better if we count only "leaves" on the "tree" signs 34. There, halves of the "month" are distinguished graphically by the "root" of the "tree" signs 34: it is round to the left of the ligature 71.66.71 and "angular" (sign 6?) to the right of it. It is worth noting that the last sign 34 contains a double circle as its base, perhaps acting as a kind of graphical "punctuation" that may function as a full stop in our writing. Similarly to the calendar text of tablet *Mamari* with a mirror frame 1.6 - 6.1 "embracing" the calendar, the calendar structure of Ev7 is set into a kind of mirror frame formed by the mirrored hands of the signs sporting some appendages below them:

One can also wonder if there is another "leaf" supplied as a rounded hand of the grapheme . This circle can be interpreted as sign 62, but in the context of the discussed structure it should be rather identified as an element of sign 35, which makes the total number of circles increase to 32.

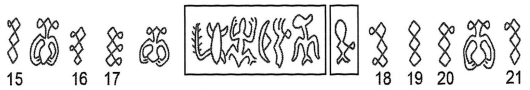
It is necessary to emphasize that the discussed fragment is closely related to text Nb1 (see fragment F.18 in Appendix 3; two final graphemes of Ev7 were included into this fragment namely on the base of comparison with Nb1). However, the version of Nb1 does not feature the structure discussed for inscription Ev7. According to me it is one of many reasons for considering text N as a copy of text E, or, pe-

rhaps, a paraphrase of some unknown prototype text (almost the entire text N is composed of the fragments shared with *Keiti* inscription, see Pozdniakov (1996: 299). The most important observation here is that all fragments Ca5-Ca9, Er1-Er3 and Ev7 have a considerable similarity with calendar structures. If there are two maybe-calendars in the text of *Keiti*, let us look for more calendar-compatible fragments in *Mamari* inscription.

Calendar structure in Ca9-Ca12?

The repetitive sequence Ca9-Ca11 (Fig. 5) also features structural peculiarities that can be interpreted as a calendar structure:

1) The passage illustrated in the figure starts *immediately* after the "official" calendar, with the sign sequence 𓂀 𓆑 interpreted as a closing "frame" of Ca5-Ca9 calendar (Fig. 1).
2) There are 31 occurrences of sign 2 (in Barthel's nomenclature) here. This number can be related to the number of nights in lunar month. Such high occurrence of the same sign in a short fragment precludes the possibility of their phonetic reading. This situation is highly reminiscent of the discussed structures in texts C and E.
3) The text shown in Fig. 5 can be divided into six delimiters (marked with frames in Fig. 5), which are distributed evenly in two halves of would-be "lunar month", similarly to that in the calendar Ca5-Ca9: there are three delimiters for the nights 1-15 and the other three for the nights 16-31.
4) The last delimiter appears after the sign corresponding to the 28th night, splitting the month into 28+3 nights, which is also the case with the calendar structures in the texts C and E.
5) In the last sixth delimiter – and only there – the hands of the lizard glyph point downwards and the head of the bird looks to the left, marking the end of a four-week cycle (28 nights).
6) The first delimiter features the separate writing of signs 10 and 70; in five further delimiters these glyphs are written together.
7) Sign 𓆑 appears 10 times in the figure, if we count glyphs 𓆑 and 𓆑 to be its allographic forms (in the similar manner, text Er features 10 occurrences of the sequence "beta" (a part of sequence "alpha") and 10 occurrences of sequence alpha.
8) The final sign 2 (corresponding to 31st night) has an uncommon "profile" depiction (sign 20 in Barthel's nomenclature). The dozens of regular correspondences in the parallel texts allow to firmly associate signs 2 and 20 as allographs. Therefore, this "turn" of the sign can be considered as a specific beginning/ending marker for a mini-text – in our case, it is a sign standing for the "last night".
9) Immediately after the 15th occurrence of sign 2, closing the first half of the month, there are several "turtle" signs 280. In a petroglyph panel located near Ahu Ra'ai (Horley 2011, Fig. 5) the turtle divides the lunar month in two halves, similarly to the discussed fragment.
10) There are three turtles in the aforementioned petroglyph, superimposed over a sequence of crescents (the central turtle divides the month in two halves, plus two turtles marking the beginning and end of the month corresponding to the 1st and 28th-30th nights). In our Fig. 5, there are also three turtle signs.
11) The position of only one (central) turtle directly corresponds to its position in the petroglyph. Two other turtles take other positions, but they also fit well into the logics of a calendar cycle. Combination of the signs 2 and 280 forms a special graphical mark of the third week enclosing the full moon (nights 15-21), where the sign 2 acts as a "frame" embracing the signs of the "turtle week":

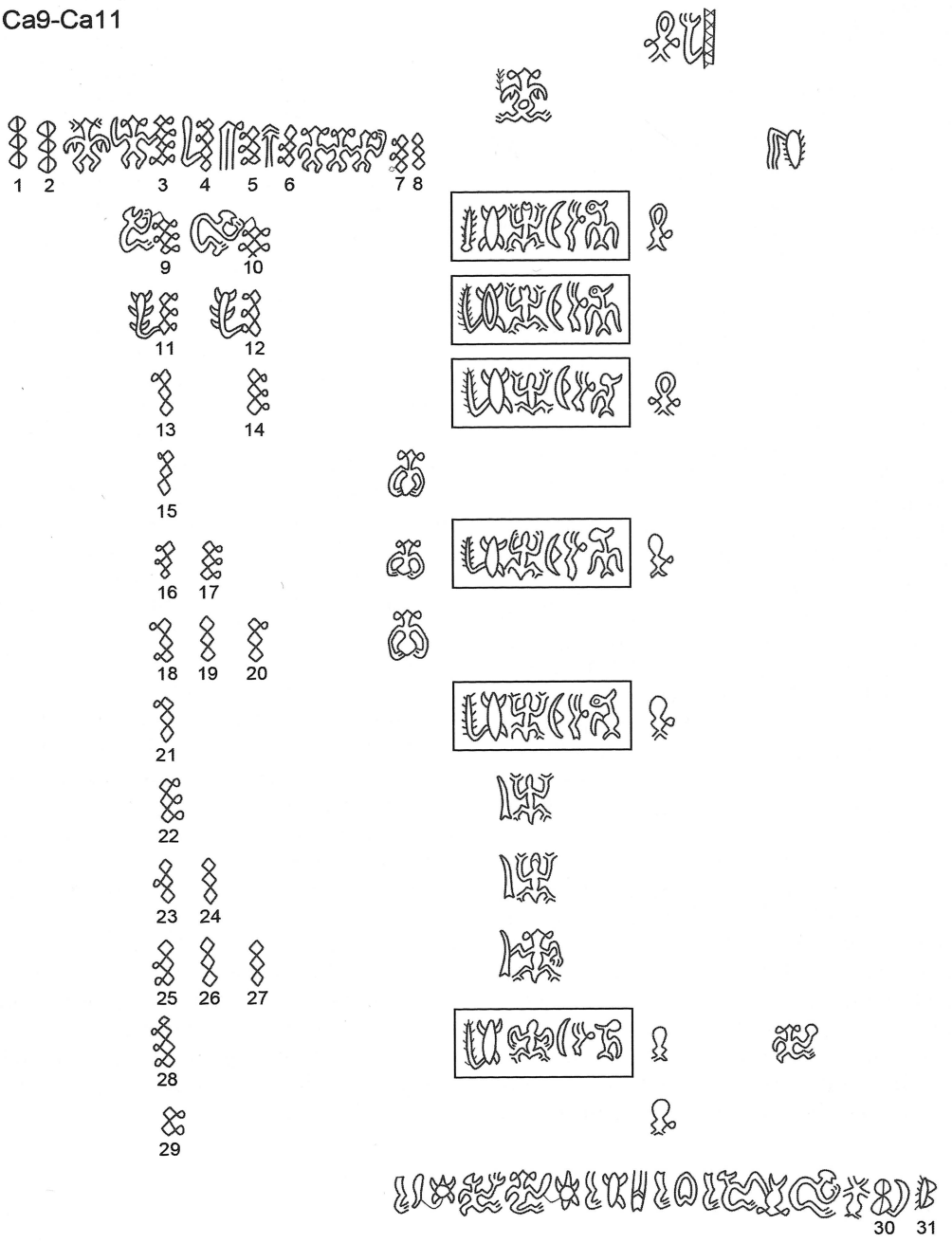


12) Similarly to the third week marked with three signs 280, there are three signs 4 marking the fourth week, nights 22-28. Apart from this usage, the sign 4 appears nowhere else in the sequence illustrated in Fig. 5.
13) The classical "lozenge" sign 2 of Rapa Nui script is composed of three shapes 𓆑. These three "diamonds" may have smaller "beads" attached, most frequently to its right side or to the both sides (𓆑 and 𓆑, respectively); in fewer cases, the beads are attached to the left side only (𓆑). The signs 2 belonging to the first half of lunar month (nights 1-15) are sporting 35 "beads", 20 of which are attached to their left side and 15 to their right side. The signs belonging to the second half of the month feature 14 "beads" (8 to the left and 6 to the right).
14) The signs depicting the closing nights (29th to 31st) of the lunar month are drawn shorter than the rest of the "lozenge" glyphs 2; they are composed only of two "diamonds" in place of the usual three. Similarly, in the line Er3 two last "adze" signs – 30th and 31st in a sequence – are drawn smaller than the preceding signs 63. This can be interpreted as intended to bring closer the cultural month composed of 31 to the astronomical month (29.5 nights); alternatively, it can be interpreted as a graphical representation of the "moonless" nights.
15) The pre-final 30th sign 2 is ligatured with a crescent glyph 41, which, except for the "official" calendar Ca5-Ca9, does not appear at all on this side of the tablet. Could it be a hint that the sequence of signs 2 should be treated in the frame of the calendar cycle, similarly to a sequence of crescents 41 in the calendar Ca5-Ca9?

Even if many of the highlighted structural characteristics are purely coincidental, such a peculiar structured fragment directly following the "official" calendar requires much attention.

The similar high concentration of signs 2 can be found on tablet *Tahua*, line Ab6 (Fig. 6). Counting the "diamonds" forming the "lozenges", one will obtain the number 2+28=30. The fragment opens with five signs 70 (Guy 2006: 60), which ironically can be interpreted as depictions of the moon.

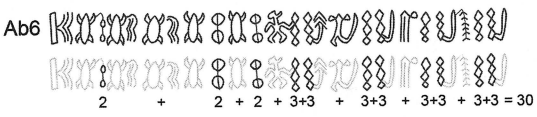
FIGURE 5



Calendar structure in Gr / K?

One of the structural highlights of the text E is a multiple repetition of the sequence 380.1 occurring 23 times on the *verso* side of the tablet. These structured glyph sequences appear in different texts, but their delimiter may vary depending on the artifact (Barthel 1958: 304-307): 380.1.3 (Gr/K), 380.1.52 (N) or 1.52 / 1.3 (A). Such a frequent occurrence of this delimiter precludes its phonetic reading – most probably, we are dealing here with a complex determinative, ideogram or perhaps a particular separator subdividing the text into autonomous short segments.

FIGURE 6



Most frequently these delimiters are seen in the texts Gr/K, illustrated side-by-side in Appendix 4. It is easy to see that the total number of delimiters 380.1.3 is 31, which is the number of occurrences of the crescent sign 41 in *Mamari* calendar, the number of "adze" glyphs 63 in Er1-Er3 and the number of "lozenge" sign 2 in Ca9-Ca11. Therefore, one has considerable bases to

assume that the passages marked with 31 delimiters 380.1(.3) may represent, for example, the names of the lunar nights or the omens connected with them, similar to those presented by Stimson. Moreover, we know that sign 380 is directly related to the ideogram of the full moon in the "official" calendar Ca5-Ca9 (see Barthel 1958: 245, Guy 1990: 136, and Horley 2011: Fig. 9). These observations motivate ourselves to study the sequence Gr/K in detail, because it may offer some hints for the phonetic reading (which is definitely not the case with the multiple inline repetitions of the same sign).

Let us consider the passages presented in Appendix 4. Before the first "block" following the delimiter 380.1 in texts Gr/K one can see the fragment F.12, one of the most common parallel sequences in the Easter Island script. As it appears in the text E, the reader may find it in Appendix 3. Table 4 gives only the beginning of this fragment, which is sufficient to see the correspondence of the signs Gr/K standing before the 1st block.

As one can see from the table, the sequence starts with *reimiro* sign 7 in the texts Gr/K. In the majority of other texts, this segment appears *after* the delimiter combination 380.1 or 1.52 (the case of Ab4). The case of Gr/K is not unique – the very same fragment opens a sequence of blocks on other tablets as well. In line Cb2 the fragment F.12 is the *first* in the sequence of 12 blocks delimited with 380.1 (lines Cb2-Cb4). Namely this fragment is the *first* in the seven-block sequence written in lines Ca2-Ca4. Namely this fragment *opens* **a** nine-element sequence delimited with glyph groups 1.52 and 1.3 in line Ab4. Namely this fragment is the *first* in the sequence of blocks written in lines Sa1-Sa6 and including at least six (or seven) textual fragments associated with delimiter 380.1. This particular fragment is seen as the sixth of 23 "nights" in block sequence of Ev2-Ev5, but this "exception" will be explained below. In the line Hv12 the analogue of delimiter 380.1 is, perhaps, the combination 1.3 (also seen in Ab4).

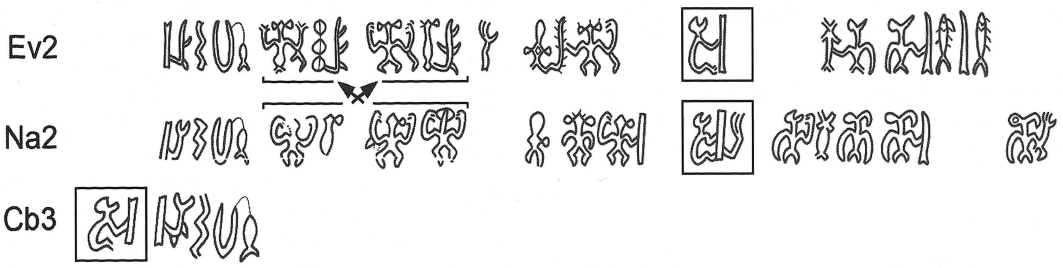
In conclusion, one can say that the long block sequences delimited with the glyph combination 380.1 or its analogs *opens in the same way, independently on the contents of these chains*; they are introduced by the same sign sequence listed as F.12 in Appendix 3. Moreover, the inverse is also true: with a rare exception (the case of Ev3) the appearance of the fragment F.12 suggests that immediately after it we will find a long chain of signs delimited with combination 380.1 or variations thereof.

Does it mean, in particular, that in the text Gr/K the first combination 380.1 was omitted, and we indeed deal here with the list of 32 "nights" in place of 31? I think that this hypothesis has a reasonable basis. Apart from the general rule described above, the change of the numeration amplifies the calendar properties of the text. Looking at the figure given in Appendix 4, let us consider the new numeration in parenthesis. Curiously, in the case of the 15th and 30th nights, one finds there the signs (15) and  (30), which do not appear anywhere else in the whole sequence of blocks. Let us compare these signs with the famous full moon ideogram  , which can be also interpreted as filled sign 22. In the *Mamari* calendar (Fig. 1) there is a sign combination  between the 30th and 31st crescents. It was not included in the night count (and perhaps, unfairly: its inclusion into the calendar with eight delimiters – parts of lunar month? – will lead to 8×4=32 nights, where the nights 15 and 31 are depicted with sign 22 in place of the crescent 41). Also, in the sequence of the signs 63 in line Er1-Er4 after the 15th glyph 63 there is a sign for "full moon", which is associated graphically with the sign bearing glyph 63  , while after the 30th "adze" glyph there is a "crescent" sign  .

Table 4

Fr. F12 (beginning)																				
Ev3	380	1	7	67	10	3	67			660	10		1	10	660		700	69	380	1	
Ev6			7	67	10	3															
Cb2	380	1		67	10	3	67		730	6-660			1	6	400	69	700		380	1	
Ra6	200	1	7	67	41	3	67	41-3	200	660			1	6	400	69	700				
Ab4		1-52	7	67	10	3	700-67			10-660			1				700	69		1	52
Hv12		1-3	7	67	22	3														1	
Ca 2-3	380	1		67	10	3	67	1											380	1	3-22
Gr2-3			7	67	10	3	67		660	660	10	660	1	10	400		700	69	380	1	3
Kr3			7	67	10	3			400			660	1	6	400		700	69	380		
Sa1	380	1		67	10	3	67			660	62		1								
Rb6			7	67	10	3															
Cb12			7	67	22	3															

FIGURE 7 : Fragment F.9



Moreover, our new 16th fragment (the first night of the waning moon) has an uncommon leftward rotation of the sign 6, which is amplified with downward turn . The same depiction peculiarity appears in the sequence of signs 63 where the 16th sign is uncommonly ligatured to the right .

Finally, the new 28th block includes turtle sign 280 – similarly to the moon-related petroglyph (see Horley 2011, Figs. 5 and 6). Three turtles (which in accordance to petroglyph are quite a pronounced hint to a calendar!) appear in the 20th block; there are turtles in 18th block as well – which are highly reminiscent of the turtle signs in lines Ca9-Ca11 standing by the 20th, 17th and 15th glyphs of a potential "calendar" based on sign 2.

Let us put aside these curious details and return to the main point. We have found that the block sequences *open with the same fragment* : F.12. It is natural to check if these lists have a similar ending. At least, for the sequences in lines Gr7 and Ev5-6 such final sequence can be found. After 31st / 32nd block in Gr7 and after 23rd block in Ev6 one notices the same combination of signs – the parts of the parallel fragment (F.17) that is quite common for the text A: Gr7 , Ev5-6 . It is worth noting that in Ev5-6, immediately after this fragment appears, our fragment F.12 opens block sequences. In this way, the fragment F.12 in the text Ev forms a frame for the block sequences delimited with glyphs 380.1. Taking into account the fact that this fragment appears in the final position only in Gr/K and Ev, it is natural to compare these two block sequences in a more systematic manner.

The difficulty of such comparison (and especially of the presentation of results) is caused by the fact that these sequences should be compared by taking into account the block sequences of the other inscriptions, in the first place including those from the texts N, Ca, Cb, Ab. To prepare the reader for a better understanding of this multi-layer comparative analysis, let us build the discussion in the following order: 1) comparison of the inscriptions E and N; 2) comparison of E, N with G/K ; 3) comparison of the block sequences C with those from E, N, G/K as well as with block sequences from the text A.

The block sequences in texts E and N

The sequence of 23 blocks written on the *verso* side of tablet *Keiti* contains 7 blocks from the text tablet N in the same order (Pozdniakov 1996, Horley 2010). In several cases two blocks of Ev correspond to a single block in text N, which means that the delimiting group 380.1.52 is sometimes omitted in the inscription of the *Small Vienna* tablet. Comparing block sequences with text E, one can conclude that text N actually has 10 blocks in place of seven explicitly marked with delimiters. To address the "compound" block in text N I will use numbers and letters. For example, the initial part of the 3rd block of text N corresponds to the 11th block in Ev, while the final part of the same block corresponds to the 12th block in *Keiti* text. Due to this, the 3rd block of text N should be split in two – blocks 3A and 3B, respectively.

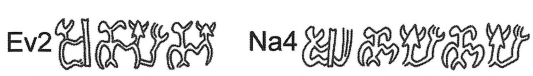
Let us compare the parallel sequence of blocks in the texts E and N. These open with the same fragment F.9 (see Appendix 3), which in addition to Ev and N also appears in line Cb3 (Figure 7) inside the delimited sequence of blocks, occupying the 4th position there.

The figure emphasizes the importance of parallel fragments in the comparative structural study of the texts. The frames shown for lines Ev2 and Na2 denote the first occurrence of the delimiter group, so that one may think that the glyphs following it represent the first block in the sequence. However, the real situation is different since the sequence starts with fragment F.9 preceding the first delimiter, and this detail was impossible to determine without a comparison with parallels in text C. Thus, all three sequences include the same fragment: it appears in full form in Ev2 and Na2 and is given in truncated form (beginning only) in line Cb3.

Actually, fragment F.9 could have been expanded with the 2nd block that follows the inscription illustrated in Figure 7:

Just after the fragment F.9 in text Ev one can find the fragment F.10. In the *Small Vienna* tablet the same block appears on the 6th position (Na5).

Fragment F.10



Immediately after the 6th block in text N (and 3rd block in text N) one finds the composite block named 7A, which corresponds to the 5th block in the inscription of *Keiti*. However, between them appears the 4th block of the text E, the "formal" place of which, as we will see from the texts Gr/K, should be "deeper" in the block sequence. Thus, removing block 4 from the chain, one obtains the identical sequence of blocks in the texts E and N: blocks 3-5 (Keiti) corresponding to blocks 6-7A (Small Vienna tablet). The inscription of Keiti continues with blocks 6-8, two of which belongs to the fragment F.12. Text N lacks the corresponding parallels. Therefore, the initial group of eight blocks from the text E are parallel to two pairs of blocks in the inscription of N (1st and 2nd blocks in N correspond to the 1st and 2nd blocks in E; 6th and 7thA in text N correspond to the 3rd and 5th blocks in E). The inscription of Gr/K does not show parallels to this part of the text, except for the important fragment F.12 (1st block in Gr/K and 6thblock in the text E).

Comparison of block chains in text E and Gr/K

Implementing new numeration Gr/K to include fragment F.12 as an initial block, one obtains 32 blocks in this sequence. Comparison of blocks Gr/K with those of Ev and N leads to very interesting results:

None of the initial blocks (occupying 1st to 16th positions) in sequence Gr/K appears in the inscriptions E and N, except for fragment F.12.

The *majority* of the blocks from the second half of the sequence Gr/K (blocks 17-32) have the corresponding passages in Ev, which, moreover, appear in the same order. The inscriptions are similar to such a degree that one can suggest that we are dealing with the same text (Figure 8).

The full validation of each correspondence is too cumbersome to be presented in this paper because it includes analysis of the parallel fragments from other texts and many other factors. However, I hope that the reader will easily spot various key signs in the compared blocks. The abridged scheme of Gr/K block sequences compared to the text E is given in Table 5.

This particular distribution of the blocks stimulates further detailed analysis of block sequences delimited with glyph combination 380.1 (and variations thereof) due to their potential relation to the calendar structures. It can be, for example, that the text Gr/K presents two halves of the lunar month, while text Ev features only one half of it.

Considering 32 blocks in the lists Gr/K (Figure 8, Appendix 4), I would like to make another comment about the length of cultural months. In his analysis of moon petroglyph from Ahu Ra'ai, Horley (2011, fig. 5) counts 30 nights, omitting four vertical lines in the upper central part of the figure, but including an extra night 16 that is absent from petroglyph tracing (though it may be present in the original carving). He also assumes that the crescent for the 28th night coincides with the outlines of the turtle, which is a point open to discussion. Under these assumptions, Horley obtains 30 nights characteristic of an astronomical month. However, counting all the lines that do appear in the tracing of the petroglyph, one obtains 32 night marks – a number that permits easy subdivision in halves, quarters and eighths. In this case, the right turtle splits the calendar into 30+2 nights, representing a good "junction" between astronomical and cultural calendars.

Block sequences in text Ca

Side Ca of Mamari tablet also contains glyphic sequences delimited with nine combinations 380.1. Except for initial and final combinations (located in Ca1 and Ca14), seven combinations are clustered in lines Ca2-Ca3. In relation to the calendar studies, block sequences in text Ca are important because they appear on the same side as the "official" calendar (lines Ca5-Ca9) and a "possible calendar" based on tightly clustered signs 2 (lines Ca9-Ca12). In a certain sense, the delimited sequences 380.1 frame these calendar structures.

Curiously, four initial blocks of the sequence have undeniable parallels with the similar block sequence in text A (line Ab4), which uses slightly different delimiters (Figure 9). Namely the parallels between Ca2-3 and Ab4 prove that the combination 1.3 is a "modified" delimiter 1.52, so that the 3rd and the 5th blocks are definitely separate entries. Starting from the 6th block, the sequence in line Ab4 does not have parallels in Ca2-Ca3.

The second part of block sequence in Ca has parallels with text Gr, also in its second half, where one observes the systematic parallels of Gr/K and Ev/N (Figure 10).

FIGURE 8

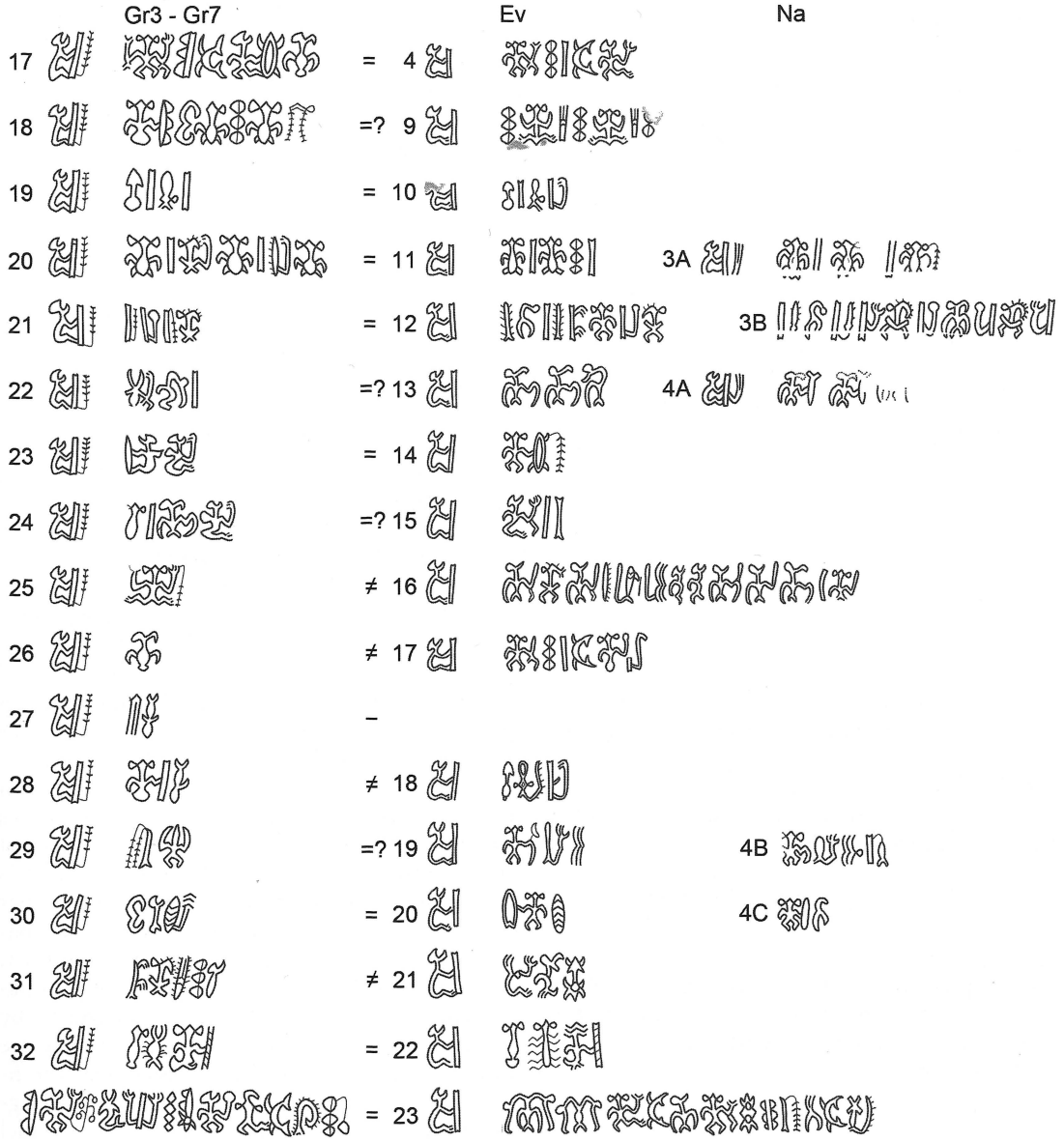
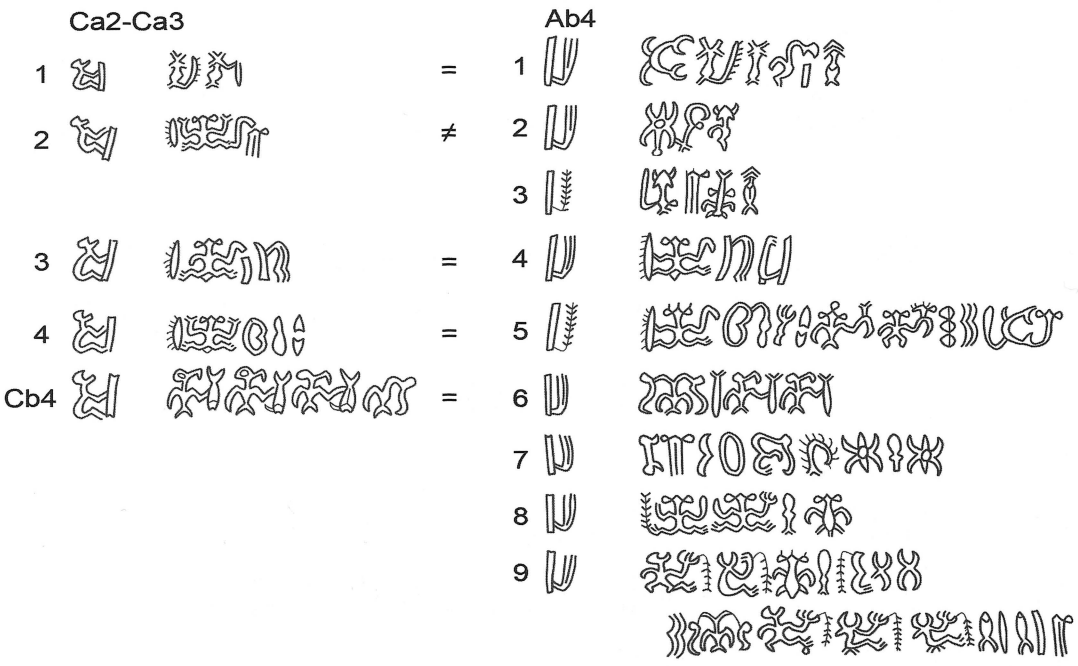


TABLE 5

Gr/K	E
Fragment F.12	Fragment F.12
First half of the sequence Blocks 1 to 16	No correspondence with Gr/K
in 15th block	
Second half of the sequence Blocks 17-32	Systematic correspondence with Gr/K
in 30th block	
Fragment F.17	Fragment F.17
Fragment F.12	Fragment F.12

FIGURE 9



Let us note that the 6th block appears also outside of 380.1 delimiter sequence: it can be found in line Aa8 inside another sequence delimited with 1.5.9 ! The same sequence of Aa8 has parallels to the 4th block of the sequence Ca2-3 and the 9th block from Ev3:

The sequences delimited with sign combination 1.5.9 require much attention; however, it is better to leave a detailed discussion of them for another occasion.

Results nd discussion

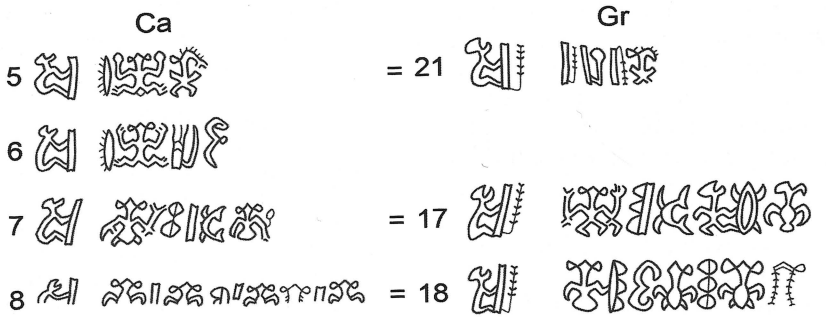
Structure of the text E

Basing ourselves on the aforementioned discussion, the structure of the text E can be presented in the following compact way (Figure 11).

Here symbol **x** marks isolated text segments that have no parallels neither in text E nor in other texts. The number of letters **x** (from 1 to 5) denotes the approximate length of the segment: one symbol **x** stands for a segment about 10 signs long, five symbols **x** correspond to a segment featuring 50 or more glyphs. The frames mark the repetitive sequences "alpha" (A) and "beta" (B), delimiter groups 380.1 referenced as (d) using nomenclature by Horley (2007: 27), parallel fragments shared with other texts (numbered F.1-F.20 according to Appendix 3). The note "ins." under the delimiter (e.g., $d5_{ins}$) means that the group 380.1 was inserted inside a known parallel fragment (in this case in F.11). Signs 12-13,14-16 and 21-22 are included into F.1.

As one can see from Figure 11, the inscription of the tablet Keiti starts with a segment (lines Er1-3) that has a similar structure to that of the acknowledged calendar Ca5-9. Line Er4 is practically devoid from original passages – it has several sequences "alpha" and "beta" and two parallel fragments (F.3 and F.4). On the contrary, the following lines Er5-9 are practically unparalleled in the other texts, which is denoted by numerous letters **x** in the figure. Namely we find here almost all segments "beta" and the final segment "alpha-gamma". The famous fragment F.7, seen at the beginning of the parallel texts P/H/Q and calendar inscription C, starts in Er9 and continues to Ev1. This observation proves that *recto* and *verso* sides were assigned correctly by Barthel, at the same time presenting a counter-argument to the suggestion by Melka (2008) and Wieczirek (2011) that each side of the tablet Keiti was inscribed with an independent text. The same fragment F.7 is also partially reproduced in the end of line Ev1. The sequence with delimiters 380.1 (also possibly related to the calendar-like structure) follows in lines Ev2-9. It is important that contents and also order of the blocks have multiple parallels in other texts. Line Ev6 contains five parallel fragments. Line Ev7 features a structured inscription that may be related to calendar. The final line Ev8 is closed with tree clustered glyphs 19 (in Barthel's nomenclature), which may possibly function as iconic signs representing the halves of a lunar month (Table 5).

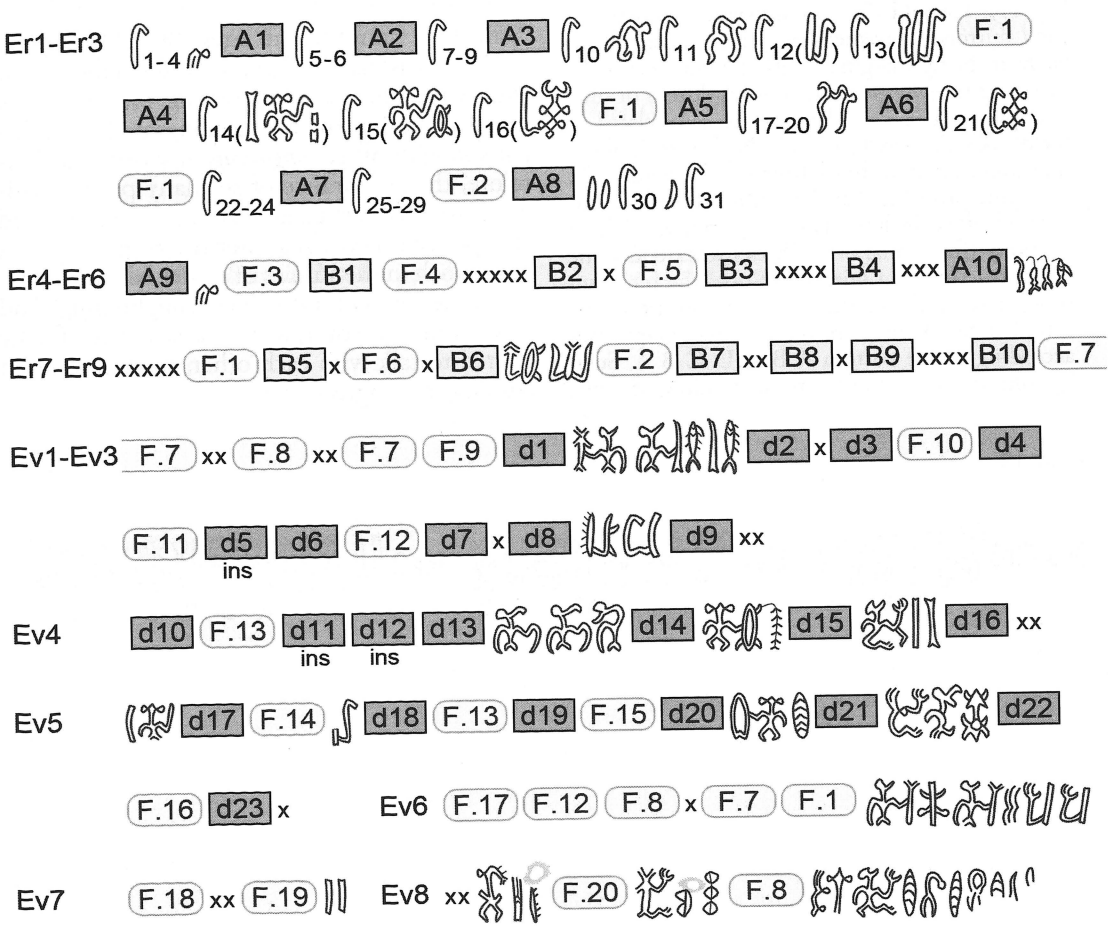
FIGURE 10



Potential calendars and the problem of phonetic reading

I would like to stress that this paper is not intended to sell a "boatload" of new calendars from Easter Island to the reader. The author is completely aware that the most difficult thing in hypotheses like these is to stop at the appropriate moment. Each proposed interpretation of *rongorongo* glyphs influences our understanding of the script and possibility of its decipherment. The accurate understanding and rebuttal of hastily-made and poorly-based conclusions may cost much time and effort for the future researchers. Allowing ourselves to step away from strict phonetic reading (e.g., claiming that the reading of a glyph varies with context) and to depart from sign catalogue founded on comparative study of multiple parallel fragments (e.g., counting the individual "diamonds" and "beads" composing Barthel's glyph 2) means that we are actually trying to deny that *rongorongo* represents a written system – the solid fact that was already firmly proven. Thus, if we hold that *rongorongo* signs

FIGURE 11



correspond to the syllables of a spoken language and hence are phonetic (namely this conclusion follows from the statistical analysis), we cannot interpret the same signs (and moreover, their parts) as ideograms. Namely because of this we avoided the passages with questionable chances of phonetic reading during our analysis and identification of the potential syllabic signs (Pozdniakov 1996, Pozdniakov-Pozdniakov 2007). However, the presence of such segments is obvious – for example, the "official calendar" in lines Ca5-9 – and one only wonders *how* this (or similar) passage could be ever read and translated (e.g., lines Er1-3 "read" by de Laat and Fedorova).

When we say that certain glyphs are *not phonetic* or *not only phonetic* in specific contexts, we refer to the following cases:

1) Extremely high concentration of the same sign in the short fragment of the text (as in the examples of Ca5-9, Ca9-12, Er1-3).
2) Delimited sequence of blocks (e.g., with a separator 380.1). These delimiters may be devoid of phonetic reading, rather acting as determinatives, markers of the proper names, lunar months, toponyms and other specific words.
3) Conspicuous ordering and "sign mirroring" in the sequence. Horley (2011) suggests that these "symmetric glyph arrangement, considerably appreciated and employed by the *rongorongo* men (were used) to improve the visual appearance of their texts", giving an example from the line Bv3 (ibid., Fig. 11). I would like to emphasize that symmetric / mirrored placement of glyphs / alloglyphs is far from being marginal exotic phenomena – the surviving *rongorongo* corpus counts dozens of such examples. Let us consider a single case related to the block sequences G/K = E = N (Figure 7), focusing attention to the block from text N (Figure 12). It is quite probable that the scribe created the elaborated block in line Na3 being motivated by a necessity (functional or aesthetic) to extend some basic structure to a mirror-like one: the bird sign (600) is set in the center of the composition, surrounded by three pairs of mirrored graphemes according to the pattern A B C D C B A. Such "graphical spoonerisms", most possibly, do not have any phonetic basis. Importantly, the "hand and stick" ligature 1.6 and 6.1 "embracing" the sequence are the same signs used to create a graphical frame for the *Mamari* calendar in lines Ca5-9.
4) The previous issue is closely related to the problem of right- and left-facing orientation of the signs and their elements, as well as their up-down "flipping". Let us sum up the main aspects of the problem. The regular use of "uncommon" sign orientation (especially in adjacent or almost-neighboring graphic forms) precludes the conclusion about its phonetic meaning – which becomes the main counterargument for the hypothesis proposed by Wieczirek. However, the question remains: what could be the possible function of sign orientation, if this function is not phonetic? There are dozens of examples bringing us to the conclusion that uncommon orientation of the signs (which is most frequently manifested by glyphs facing to the left) most probably forms *a graphic frame* to mark the end of a mini-text and to separate it from the next meaningful passage. If this hypothesis is true, sign orientation might function as a clever analog of punctuation signs (a coma or a period) in *rongorongo* script. Perhaps, there could be other explanations, but I would rather refrain from voicing them at the moment. In any case, the systematic analysis of this particular glyph use (that should be addressed in depth in a separate publication) may significantly improve our understanding of *rongorongo* script, the function of allographs and the bases of the sign catalogue.

Finally, I would like to stress that there are no obvious reasons to claim that the tablet *Keiti* (text E) is the most interesting or, let us say, most promising for the decipherment in comparison with other *rongorongo* inscriptions. Therefore, the appearance of so many papers dedicated to this particular text can be interpreted as a positive signal marking the beginning of a new epoch in the studies of Easter Island script – when the times of individual "enlightening" and "revelations" are over, when the specialists finally started to talk with each other, sometimes even coming to an agreement.

FIGURE 12

Acknowledgements

I would like to thank Paul Horley for his useful comments and critics, as well as for the tracings of *rongorongo* glyphs shown in the figures of this paper.

BIBLIOGRAPHY

Barthel Thomas, 1958. *Grundlagen zur Entzifferung der Osterinselschrift*, Hamburg, Cram, de Gruyter.

Butinov Nikolay A. and Yuri V. Knorozov, 1957. Preliminary report on the study of the written language of Easter Island, *Journal of the Polynesian Society* 66, pp. 5–17.

Fedorova Irina K., 2001. "Talking boards" from Easter Island: deciphering, reading, translation. St. Petersburg: Kunstkamera)

Guy Jacques, 1990. The lunar calendar of tablet Mamari, *Journal de la Société des Océanistes* 91, pp. 135-149.

—, 2006. General Properties of the *rongorongo* writing, *Rapa Nui Journal* 20, pp. 53-66.

Harrison J. Park, 1874, The hieroglyphs of Easter Island, *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 3, pp. 370-383.

Horley Paul, 2005. Allographic variations and statistical analysis of the Rongorongo script, *Rapa Nui Journal* 19, pp. 107-116.

—, 2007. Structural Analysis of *rongorongo* script, *Rapa Nui Journal* 21 (1), pp. 25-32.

—, 2010. *Rongorongo* Tablet *Keiti*, *Rapa Nui Journal* 24 (1), pp. 45-56.

—, 2011. Lunar Calendar in *rongorongo* texts and rock art of Easter Island (current issue of the *Journal*).

Laat M. (de) , 2009. Words out of wood: proposals dor the decipherment of the Easter Island script, Eburon Delft.

Melka Tomi S., 2008. Structural observations regarding rongorongo tablet '*Keiti*', *Cryptologia* 32, 2, pp. 155-179.

Pozdniakov Konstantin, 1996. Les bases du déchiffrement de l'écriture de l'île de Pâques, *Journal de la Société des Océanistes* 103 (2), pp. 289-303.

Pozdniakov Igor and Konstantin Pozdniakov, 2007. Rapanui writing and the Rapanui language: preliminary results of a statistical analysis, *Forum for Anthropology and Culture* 3, pp. 3-36.

Mere Robert, Frank Weko, Liliana Clarke. *Maramataka: the Maori Moon Calendar.* Research Report 283. August 2006. Matauranga Maori and Bio Protection Research Team. National Centre for Advanced Bio-Protection Technologies. Lincoln University, Canterbury, New Zealand. http://www.lincoln.ac.nz/Documents/2333_RR283_s6506.pdf

Stimson J. Frank, 1928. Tahitian names for the nights of the moon. *Journal of the Polynesian Society* 37(147), pp. 326-337.

Wieczorek Rafal M., 2011. Astronomical content in *rongorongo* tablet *Keiti* (current issue of the Journal).

ABSTRACT

This paper is dedicated to structural analysis of rongorongo tablet Keiti. Following the numerous papers appearing on the subject in the past years, it is important to establish a standard for a rigorous structural analysis. It should include not only repetitive groups of signs, but also must consider the general layout of the text, anomalously high glyph occurrence, parallel passages shared with other texts and their order. It is fashionable to write about possible calendar-like structures in Easter Island texts, following the discoveries by Barthel and Guy of the probable schematic structure of lunar month on the tablet Mamari. While it was thought that the aforementioned list is unique in the whole rongorongo corpus, it is important to highlight various other text fragments that have the similar structural properties and feature about 30 repetitive elements, which may be considered as indicators of their relation to the moon cycle. One of these lists is widely known sequence delimited with glyphic group 380.1. At the same time, one should be aware that very pronounced repetitive character of single sign or sign group significantly limits the possibility of phonetic reading of rongorongo passages, which brings forth again still unanswered question about the proper content identification of the survived monuments of Easter Island script.

KEYWORDS: *Easter Island, rongorongo writing, structures of rongorongo inscriptions, calendar-like structures in Easter Island texts, catalogue of rongorongo signs, parallel passages in different texts*

RESUMÉ

L'écriture Rapa Nui n'est toujours pas déchiffrée à ce jour, malgré quelques déclarations triomphantes affirmant le contraire. Pour ce qui est du contenu sémantique des textes rapanui, le seul point qui fait consensus est l'existence d'un calendrier dans l'un des fragments du texte appelé Mamari. Il a pu être identifié grâce à la structure particulière de ce texte, mise en évidence par Thomas Barthel et Jacques Guy. Cet article montre que la structure en question se retrouve également dans des fragments de la plupart des textes rongorongo. J'analyse également certaines autres structures largement représentées dans l'écriture rapanui et je pose des principes pour l'analyse structurale d'un texte rongorongo, appliqués à l'analyse du texte dit Keiti. *Ce choix vient de ce qu'il a été au centre d'une polémique entre chercheurs confrontant leurs approches théoriques pour le dechiffrement de l'écriture Rapa Nui. La très grande majorité d'entre eux s'appuie sur le catalogue de Thomas Barthel (500 graphèmes) qui, on le sait, comprend non seulement des signes, mais aussi des ligatures, c'est-à-dire des combinaisons de signes. Les résultats présentés ici s'appuient au contraire sur un catalogue de 50 signes (annexe 1). C'est la découverte de plusieurs séquences parallèles de signes dans différents textes et leur analyse qui ont permis de remettre en cause le catalogue de Barthel. Vingt d'entre elles sont présentées dans l'annexe 3 de l'article où elles sont, pour la plupart, publiés pour la première fois.*

MOTS-CLÉS : *île de Pâques, écriture rongorongo, structure des textes Rapa Nui, calendriers en rongorongo, catalogue des signes rongorongo, fragments parallèles des textes différents.*

Appendix 1. – Catalogue of **rongorongo** signs (Pozdniakov-Pozdniakov 2007)

	1		15		47		69		380
	2		16		50		70		400
	3		22		52		71		530
	4		25		53		74		660
	5		27		59		76		700
	6		28		60		91		720
	7		34		61		95		730
	8		38		62		99		901
	9		41		63		200	?	999
	10		44		66		240		
	14		46		67		280		

Appendix 2. – Transliteration of text E using glyph catalogues by Barthel (1958) and Pozdniakov-Pozdniakov (2007)[1]

N°	Line	Barthel	P & P	N°	Line	Barthel	P & P	N°	Line	Barthel	P & P	N°	Line	Barthel	P & P
1	Er01	40 (**4**)	1	51	Er01	063.	63	101	Er02	300-	200	151	Er03	430y-	200
2	Er01	630	400	52	Er01	061-	61	102	Er02	040-	41	152	Er03	022.	22
3	Er01	4 (**22.**)	10	53	Er01	063.	63	103	Er02	300.	200	153	Er03	380y-	380
4	Er01	739 (**380-**)	730	54	Er01	061-	61	104	Er02	028x-	28	154	Er03	203s-	200
5	Er01	200.	200	55	Er01	040-	41	105	Er02	004.	4	155			63
6	Er01	022-	22	56	Er01	040-	41	106			6	156			10
7	Er01	063-	63	57	Er01	300.	200	107	Er02	430-	200	157	Er03	060-	60
8	Er01	208.	200	58	Er01	028x-	28	108	Er02	022.	41	158	Er03	063-	63
9			200	59	Er01	004.	4	109	Er02	380y-	380	159	Er03	001-	1
10	Er01	063y-	63	60			10	110	Er02	203-	200	160	Er03	063-	63
11	Er01	200.	200	61	Er01	430-	400	111			63	161			6
12	Er01	006x.	6	62	Er01	022*	41	112	Er02	004?.	44	162	Er03	430y.	400
13	Er01	063-	63	63	Er02	203s (**200.59-**)	200	113	Er02	062?-	62	163	Er03	004-	4
14	Er01	005.	5	64	Er02	063-	63	114	Er02	203-	200	164			6
15	Er01	063y-	63	65			10	115			63	165	Er03	431y-	400
16	Er01	040.	41	66			63	116	Er02	063x-	10	166			10
17	Er01	300-	200	67			10	117	Er02	203-	200	167	Er03	203-	200
18	Er01	041-	41	68	Er02	670-	660	118			63	168			63
19	Er01	300y-	200	69	Er02	063-	63	119	Er02	044-	44	169			901
20	Er01	300.	200	70			10	120	Er02	203.	200	170	Er03	562-	400
21	Er01	024-	28	71	Er02	670-	660	121			63	171			69
22	Er01	004.	4	72	Er02	001.	1	122	Er02	073?.	44	172			901
23			10	73	Er02	063-	63	123	Er02	006-	6	173	Er03	063-	63
24	Er01	430-	400	74	Er02	062.	62	124	Er02	063-	63	174	Er03	048?-	45
25	Er01	022.	22	75	Er02	001.	1	125	Er02	670-	660	175	Er03	063-	63
26	Er01	430y-	380	76	Er02	063-	63	126			660	176	Er03	071.	71
27	Er01	206.	200	77	Er02	041-	41	127	Er02	040-	41	177	Er03	065.	66
28			6	78	Er02	300-	200	128	Er02	040-	41	178	Er03	071-	71
29	Er01	063-	63	79	Er02	040-	41	129	Er02	300.	200	179	Er03	041-	41
30	Er01	086.	9	80	Er02	300.	200	130	Er02	028x-	28	180	Er03	041-	41
31	Er01	063-	63	81	Er02	028x-	28	131	Er02	004-	4	181	Er03	300.	200
32	Er01	722.	720	82	Er02	004.	4	132	Er02	022*	41	182	Er03	028x-	28
33	Er01	063-	63	83			10	133	Er03	203s-	200	183	Er03	004.	4
34	Er01	040-	41	84	Er02	430?-	400	134			63	184			6
35	Er01	300.	200	85	Er02	022.	22	135	Er03	005t-	5	185	Er03	430-	400
36	Er01	040-	41	86	Er02	380y-	380	136	Er03	678-	700	186	Er03	022.	22
37	Er01	300y-	200	87	Er02	203s-	200	137	Er03	063-	63	187	Er03	380y-	380
38	Er01	300.	200	88			63	138	Er03	002-	2	188	Er03	203-	200
39	Er01	024-	28	89			6	139			38	189			63
40	Er01	004.	4	90	Er02	001-	1	140	Er03	123-	66	190	Er03	022-	22
41			10	91	Er02	203-	200	141	Er03	063.	63	191	Er03	022-	22
42	Er01	430-	400	92			63	142	Er03	003-	3	192	Er03	063-	63
43	Er01	022.	22	93	Er02	016-	16	143	Er03	063-	63	193	Er03	041-	41
44	Er01	430y (**380**)	380	94	Er02	203-	200	144	Er03	63(**144-**)	63	194	Er03	063*	63
45	Er01	201.	200	95			63	145	Er03	041-	41	195	Er04	385-	380
46			61	96	Er02	070t-	70	146	Er03	040-	41	196	Er04	040-	41
47	Er01	063-	63	97	Er02	063-	63	147	Er03	300.	200	197	Er04	300.	200
48	Er01	061?.	61	98			2	148	Er03	028x-	28	198	Er04	040-	41
49	Er01	063.	63	99	Er02	118-	38	149	Er03	004.	4	199	Er04	300.	200
50	Er01	061?-	61	100	Er02	040-	41	150			6	200	Er04	028x-	28

1. Barthel's tracings / transcription contain several errors, corrected by Horley (2010: Fig. 5). These corrections are shown here in Barthel's column as boldface numbers in parentheses. Question mark "?" is used when the actual sign does not appear in Barthel's catalogue; the letter "X" denotes that the current sign has to be removed.

N°	Line	Barthel	P & P	N°	Line	Barthel	P & P	N°	Line	Barthel	P & P	N°	Line	Barthel	P& P
201	Er04	004.	4	251	Er04	048-	48	301	Er05	002-	2	351			10
202			10	252	Er04	520fy.	200	302			10	352	Er06	430y-	400
203	Er04	430-	400	253			59	303	Er05	670-	660	353	Er06	300.	200
204	Er04	022-	22	254	Er04	044-	44	304	Er05	002-	2	354	Er06	001-	1
205			200	255	Er04	007-	7	305	Er05	200.	200	355	Er06	430-	400
206	Er04	520fy.	59	256	Er04	380.	380	306	Er05	002-	2	356	Er06	008-	8
207	Er04	063-	63	257	Er04	044-	44	307			63	357	Er06	300.	200
208	Er04	005t-	5	258	Er04	721-	720	308	Er05	431y-	400	358	Er06	001.	1
209	Er04	386.	380	259	Er04	415-	400	309			10	359	Er06	076-	76
210			6	260			400	310	Er05	002-	2	360	Er06	049f-	45
211	Er04	003-	3	261			10	311	Er05	200.	200	361	Er06	200.	200
212			2	262	Er04	074-	62	312	Er05	022-	22	362	Er06	001-	1
213	Er04	013-	1	263	Er04	526y-	200	313	Er05	206s-	200	363	Er06	206-	200
214			2	264			59	314			6	364			6
215	Er04	008-	8	265			6	315			6	365	Er06	004.	4
216	Er04	405-	400	266	Er04	001-	1	316	Er05	001-	1	366	Er06	431-	400
217			10	267	Er04	005*	5	317	Er05	206.	200	367	Er06	022.	22
218			10	268	Er05	204s-	200	318			6	368	Er06	380y-	380
219	Er04	670-	660	269			6	319	Er05	076?-	76	369	Er06	200.	200
220	Er04	053.	53	270			6	320	Er05	048-	45	370	Er06	450-	280
221	Er04	009-	9	271	Er05	001-	1	321	Er05	004.	4	371	Er06	280.	280
222	Er04	002.	2	272	Er05	005-	5	322			10	372	Er06	450-	280
223	Er04	010?.	41	273	Er05	204s-	200	323	Er05	430y-	400	373	Er06	770b-	280
224	Er04	009-	9	274			6	324	Er05	022.	22	374			280
225	Er04	002.	2	275			6	325	Er05	380y-	380	375	Er06	450-	280
226	Er04	009-	9	276	Er05	009-	9	326	Er05	300y?.	200	376	Er06	730-	730
227	Er04	739-	730	277	Er05	005-	5	327	Er05	044-	44	377	Er06	450-	280
228	Er04	027-	27	278	Er05	204s-	200	328	Er05	300y?.	200	378	Er06	730-	730
229	Er04	739-		279			6	329	Er05	044-	44	379	Er06	450-	280
230	Er04	006-	6	280			6	330	Er05	300.	200	380	Er06	407-	400
231	Er04	090-	280	281	Er05	005-	5	331	Er05	044?-	53	381			901
232	Er04	004.	4	282	Er05	205s-	200	332	Er05	300.	200	382	Er06	450-	280
233			10	283			10	333	Er05	053-	53	383			901
234	Er04	430-	400	284			6	334	Er05	200.	200	384	Er06	608-	400
235	Er04	022.	22	285	Er05	005-	5	335	Er05	053-	53	385			901
236	Er04	380y-	380	286	Er05	205s-	200	336	Er05	017-	16	386	Er06	450-	280
237			10	287			10	337	Er05	053-	53	387	Er06	680-	660
238			10	288			6	338	Er05	017-	16	388			660
239	Er04	305.	200	289	Er05	001-	1	339	Er05	004.	4	389	Er06	040-	41
240			6	290	Er05	049-	45	340			10	390	Er06	040-	41
241	Er04	047.	48	291	Er05	005-	5	341	Er05	430*	400	391	Er06	300.	200
242	Er04	074f-	74	292	Er05	205s?-	200	342	Er06	022.	22	392	Er06	028x-	28
243	Er04	004.	4	293			10	343	Er06	460-	660	393	Er06	004.	4
244	Er04	008-	8	294			6	344	Er06	739-	730	394			10
245	Er04	048-	45	295	Er05	700-	700	345	Er06	300-	200	395	Er06	430-	400
246	Er04	007-	7	296	Er05	700-	700	346	Er06	739-	730	396	Er06	022.	22
247	Er04	001-	1	297	Er05	005-	5	347	Er06	300y-	200	397	Er06	380y-	380
248	Er04	191.	200	298	Er05	001-	1	348	Er06	300.	200	398	Er06	204.	200
249			41	299			10	349	Er06	004.	4	399			6
250			61	300	Er05	670-	660	350	Er06	064?-	6	400	Er06	077-	44

N°	Line	Barthel	P & P	N°	Line	Barthel	P & P	N°	Line	Barthel	P & P	N°	Line	Barthel	P & P
401	Er06	711?-	700	451			901	501	Er08	380y-	380	551	Er09	041-	10
402	Er06	711-	700	452			62	502	Er08	200-	200	552	Er09	045-	45
403	Er06	700*	700	453	Er07	407-	400	503	Er08	400.	400	553	Er09	381-	380
404	Er07	001-(**10.**)	1	454			901	504	Er08	005-	5	554			61
405	Er07	053-	53	455	Er07	522fy-	99	505			10	555	Er09	770-	280
406	Er07	022-	22	456	Er07	002-	2	506	Er08	255-	240	556			280
407	Er07	022-	22	457	Er07	010.	10	507			10	557	Er09	770-	280
408	Er07	076-	76	458	Er07	007-	7	508			6	558			280
409	Er07	022-	22	459	Er07	004.	4	509	Er08	279-	380	559	Er09	092?-	280
410	Er07	022-	22	460			10	510			10	560	Er09	000!-	280
411	Er07	092-	280	461	Er07	431-	400	511	Er08	010.	10	561			280
412	Er07	050.	50	462	Er07	022.	22	512			10	562	Er09	000!-	280
413	Er07	006-	6	463	Er07	380y-	380	513	Er08	430y-	400	563			10
414			10	464	Er07	204s-	200	514	Er08	010.	10	564	Er09	256?-	240
415	Er07	670-	660	465			6	515	Er08	009-	9	565			10
416	Er07	092-	280	466			6	516	Er08	004.	4	566	Er09	386-	380
417	Er07	050.	50	467			200	517			10	567			6
418	Er07	006-	6	468	Er07	664-	660	518	Er08	430-	400	568	Er09	700-	700
419			10	469			62	519	Er08	022.	22	569	Er09	700-	700
420	Er07	670-	660	470	Er07	091-	280	520	Er08	380y-	380	570	Er09	380.	380
421	Er07	092-	280	471	Er07	008.	8	521	Er08	226-	200	571	Er09	739-	730
422	Er07	050.	50	472	Er07	009*	9	522			61	572	Er09	141-	41
423	Er07	006-	6	473			62	523			6	573	Er09	380.	380
424			10	474	Er08	091-	280	524	Er08	022f-	4	574	Er09	739-	730
425	Er07	670-	660	475	Er08	008-	8	525			3	575	Er09	009-	9
426	Er07	002-	2	476	Er08	001?-	1	526			10	576	Er09	380.	380
427			10	477	Er08	000!-	280	527	Er08	670-	660	577	Er09	017-	16
428	Er07	670-	660	478	Er08	053-	6	528	Er08	700-	700	578	Er09	004.	4
429	Er07	002-	2	479	Er08	000!-		529	Er08	381-	380	579			6
430			10	480	Er08	004.	4	530			61	580	Er09	670-	660
431	Er07	670-	660	481			10	531	Er08	079-	95	581	Er09	022.	22
432	Er07	002-	2	482	Er08	430-	400	532	Er08	004.	4	582	Er09	430y-	380
433	Er07	027x?-	44	483	Er08	022.	22	533			6	583	Er09	001.	1
434			62	484	Er08	380y-	380	534	Er08	670-	660	584	Er09	009-	9
435	Er07	027x?-	44	485	Er08	093-	95	535	Er08	022.	22	585	Er09	755-	730
436			62	486	Er08	069.	69	536	Er08	380y-	380	586	Er09	050.	50
437	Er07	420y.	200	487	Er08	070-	70	537	Er08	011.	1	587	Er09	010-	10
438	Er07	005-	5	488	Er08	004.	10	538	Er08	208-	200	588	Er09	005-	5
439	Er07	200?.	200	489	Er08	065.	66	539			200	589	Er09	037?-	2
440			61	490	Er08	004-	10	540			10	590	Er09	045?-	45
441	Er07	048-	48	491	Er08	006-	6	541	Er08	470.	660	591	Er09	001-	1
442			901	492			10	542	Er08	076-	76	592			901
443	Er07	608-	400	493			400	543	Er08	739*	730	593	Er09	561-	400
444		vcx	901	494	Er08	206s-	200	544	Er09	22f (**60f-**)		594			400
445	Er07	205-	200	495			6	545	Er09	770 (**290-**)		595			901
446			10	496			6	546	Er09	060-	60	596	Er09	700-	700
447	Er07	019?-	700	497	Er08	004.	4	547	Er09	400 (**200**)	200	597	Er09	280-	280
448	Er07	205-	200	498			10	548	Er09	225 (**224**)	240	598	Er09	001?-	1
449			10	499	Er08	430-	400	549			10	599	Er09	007*	7
													Ev01	**730.**	
450	Er07	697-	200	500	Er08	022.	22	550	Er09	380.	380	600	Ev01	022(**001.**)	22

N°	Line	Barthel	P&P	N°	Line	Barthel	P&P	N°	Line	Barthel	P&P	N°	Line	Barthel	P&P
601	Ev01	002-	2	651	Ev01	006-	6	701			10	751	Ev03	009-	9
602	Ev01	034V?-	34	652			6	702	Ev02	380.	380	752	Ev03	062.	62
603	Ev01	002-	2	653	Ev01	379y?-	380	703	Ev02	001-	1	753	Ev03	006-	6
604	Ev01	001-	1	654	Ev01	025-	25	704	Ev02	739 (**67.**)	730	754	Ev03	001-	1
605	Ev01	002-	2	655	Ev01	006-	6	705	Ev02	400-	400	755	Ev03	006-	6
606	Ev01	034-	34	656	Ev01	000!-	6	706	Ev02	400.	400	756	Ev03	001?-	1
607	Ev01	306.	200	657			44	707	Ev02	004-	4	757	Ev03	006.	6
608			6	658			6	708	Ev02	700-	700	758	Ev03	003-	3
609	Ev01	003-	3	659	Ev01	254?-	240	709	Ev02	004-	4	759			10
610	Ev01	070-	70	660		001.	6	710	Ev02	700-	700	760	Ev03	670.	660
611	Ev01	521s-	99	661	Ev01	009-	9	711	Ev02	380.	380	761	Ev03	711-	700
612			61	662	Ev01	4 (**754**)	4	712	Ev02	001-	1	762			62
613			10	663	Ev01	64 (**XX-**)	6	713			3	763	Ev03	091.	280
614	Ev01	306.	200	664	Ev01	050-	50	714	Ev02	022f.	22	764	Ev03	711-	700
615			6	665	Ev01	1 (**10-**)	1	715	Ev02	071-	71	765	Ev03	380.	380
616	Ev01	003-	3	666	Ev01	005.	5	716	Ev02	343 (**??-**)	240	766	Ev03	001-	1
617	Ev01	070-	70	667	Ev01	037*	2	717			63	767	Ev03	007-	7
618	Ev01	063?-	61	668	Ev02	002.	2	718	Ev02	044t-	44	768	Ev03	067.	67
619	Ev01	022f-	22	669	Ev02	003-	3	719	Ev02	697 (**??-**)	400	769	Ev03	010f-	10
620			3	670			6	720			200	770			3
621	Ev01	063?-	61	671	Ev02	254-	240	721			901	771	Ev03	067.	67
622	Ev01	001-	4	672			6	722	Ev02	380.	380	772	Ev03	010t.	660
623			63	673	Ev02	522f-	99	723	Ev02	001-	1	773	Ev03	490-	10
624	Ev01	694-	200	674	Ev02	022f-	22	724	Ev02	600 (**607.**)	400	774	Ev03	001t-	1
625			6	675			3	725	Ev02	591 (**009.**)	9	775			10
626	Ev01	056-	41	676	Ev02	001.	1	726	Ev02	006-	6	776	Ev03	670-	660
627			6	677	Ev02	071-	71	727	Ev02	400 (**407.**)	400	777	Ev03	580-	700
628	Ev01	034-	34	678	Ev02	077-	44	728	Ev02	591(**009-**)	9	778			69
629	Ev01	700-	700	679	Ev02	027.	27	729	Ev02	380.	380	779	Ev03	380.	380
630	Ev01	204s-	200	680	Ev02	711-	700	730	Ev02	001*	1	780	Ev03	001-	1
631			6	681			62	731	Ev03	204s-	200	781			10
632			10	682	Ev02	294s-	280	732			6	782	Ev03	245.	240
633	Ev01	005-	5	683			6	733			10	783	Ev03	022f-	22
634	Ev01	022f-	22	684			6	734	Ev03	002-	2	784			3
635			3	685	Ev02	002.	2	735	Ev03	001-	1	785	Ev03	004.	4
636	Ev01	068-	67	686	Ev02	071-	71	736	Ev03	007-	7	786	Ev03	004-	4
637	Ev01	073?.	22	687			61	737	Ev03	326-	200	787	Ev03	380.	380
638	Ev01	006.	6	688	Ev02	211s-	200	738			61	788	Ev03	001-	1
639	Ev01	003-	3	689			61	739			6	789			3
640	Ev01	005-	5	690			10	740	Ev03	380.	380	790	Ev03	022f.	22
641	Ev01	079.	95	691			62	741	Ev03	001-	1	791	Ev03	071-	71
642	Ev01	10 (**62**)	62	692	Ev02	091-	280	742	Ev03	070-	70	792	Ev03	063.	63
643	Ev01	079.	95	693	Ev02	071-	71	743	Ev03	040.	41	793	Ev03	001?-	1
644	Ev01	10 (**62**)	62	694	Ev02	006-	6	744	Ev03	211x(**214.**)	95	794	Ev03	380.	380
645	Ev01	300.	200	695			6	745	Ev03	003-	3	795	Ev03	001-	1
646	Ev01	058-	700	696	Ev02	047.	48	746	Ev03	290.	280	796	Ev03	002-	2
647	Ev01	048?-	700	697	Ev02	010f.	34	747	Ev03	095-	95	797			10
648	Ev01	000!-	200	698			3	748			6	798	Ev03	760-	240
649	Ev01	000!-		699	Ev02	201s-	200	749	Ev03	062?.	62	799			10
650	Ev01	001?.	1	700			61	750	Ev03	004?-	10	800	Ev03	050-	50

N°	Line	Barthel	P&P	N°	Line	Barthel	P&P	N°	Line	Barthel	P&P	N°	Line	Barthel	P&P
801	Ev03	002-	2	851	Ev04	003-	3	901			62	951			61
802			10	852	Ev04	380.	380	902	Ev05	088-	9	952			6
803	Ev03	760-	240	853	Ev04	001-	1	903			6	953	Ev05	007-	7
804			10	854	Ev04	376s-	380	904	Ev05	047.	48	954	Ev05	400-	400
805	Ev03	050-	50	855			6	905	Ev05	010-	10	955	Ev05	206s-	200
806	Ev03	002*	2	856			10	906	Ev05	001.	1	956			6
807	Ev04	380.	380	857	Ev04	001-	1	907	Ev05	061-	61	957			10
808	Ev04	001-	1	858	Ev04	001V-	1	908	Ev05	380.	380	958	Ev05	080*	8
809	Ev04	088-	62	859	Ev04	380.	380	909	Ev05	001-	1	959			8
810			9	860	Ev04	001-	1	910	Ev05	207-	200	960	Ev06	020-	2
811	Ev04	001-	1	861	Ev04	405s-	400	911			901	961	Ev06	020-	2
812			6	862			10	912	Ev05	040h-	41	962	Ev06	004.	4
813	Ev04	047-	48	863			10	913	Ev05	073.	700	963	Ev06	003-	3
814	Ev04	001.	1	864	Ev04	522f-	99	914	Ev05	006-	6	964	Ev06	056-	41
815	Ev04	061?-	61	865	Ev04	405s-	400	915	Ev05	053-	53	965			6
816	Ev04	380.	380	866			10	916	Ev05	380.	380	966	Ev06	007-	7
817	Ev04	001-	1	867			10	917	Ev05	001-	1	967	Ev06	067.	67
818	Ev04	280-	280	868			3	918	Ev05	028.	28	968	Ev06	010f-	10
819	Ev04	001-	1	869	Ev04	022f-	22	919	Ev05	200-	200	969			3
820	Ev04	280-	280	870	Ev04	010.	10	920	Ev05	019-	22	970	Ev06	244s-	240
821	Ev04	002-	2	871	Ev04	700-	700	921			3	971			6
822	Ev04	001-	1	872	Ev04	010.	62	922	Ev05	380.	380	972			62
823	Ev04	380.	380	873	Ev04	053-	53	923	Ev05	001-	1	973	Ev06	027.	28
824	Ev04	001-	1	874			10	924	Ev05	172-	380	974	Ev06	006-	6
825			3	875	Ev04	430-	400	925			6	975	Ev06	077.	44
826	Ev04	001f-	1	876			10	926			6	976	Ev06	034-	34
827			3	877	Ev04	430-	400	927			6	977	Ev06	004-	4
828	Ev04	057-	41	878	Ev04	407-	400	928	Ev05	631-	400	978	Ev06	522fy-	99
829			62	879			901	929			10	979	Ev06	700-	700
830	Ev04	001-	1	880			62	930	Ev05	009:	8	980	Ev06	600-	400
831			3	881	Ev04	405-	400	931	Ev05	008-	9	981	Ev06	059f-	59
832	Ev04	001f-	1	882			10	932	Ev05	380.	380	982	Ev06	324-	200
833			3	883	Ev04	407*	400	933	Ev05	001-	1	983			61
834	Ev04	163-	1	884			901	934			41	984			6
835			61	885	Ev05	22 (**001-**)	22	935	Ev05	091-	280	985	Ev06	004.	4
836	Ev04	200-	200	886	Ev05	205-	200	936			3	986	Ev06	004-	4
837	Ev04	001.	1	887			10	937	Ev05	774-	280	987	Ev06	030a-	34
838	Ev04	062-	62	888	Ev05	308.	380	938			3	988	Ev06	004-	4
839	Ev04	522fy-	99	889	Ev05	001-	1	939			6	989	Ev06	055.	6
840	Ev04	380.	380	890	Ev05	205s-	200	940	Ev05	581.	200	990	Ev06	010-	10
841	Ev04	001-	1	891			10	941			69	991	Ev06	244.	240
842	Ev04	607-	400	892	Ev05	002-	2	942	Ev05	011-	1	992			6
843			901	893	Ev05	001-	1	943	Ev05	380.	380	993	Ev06	077-	44
844	Ev04	607-	400	894	Ev05	007-	7	944	Ev05	001-	1	994	Ev06	730.	730
845			901	895	Ev05	292-	280	945	Ev05	680-	660	995	Ev06	001-	1
846	Ev04	650y-	400	896			62	946			660	996	Ev06	002.	2
847	Ev04	380.	380	897	Ev05	001t.	1	947	Ev05	684-	660	997	Ev06	034-	34
848	Ev04	001-	1	898	Ev05	063-	63	948			700	998	Ev06	002-	2
849	Ev04	200.	200	899	Ev05	380.	380	949			660	999	Ev06	001-	1
850	Ev04	070.	70	900	Ev05	001-	1	950	Ev05	224-	200	1000	Ev06	002.	2

2. Roman numerals in italics denote isolated sequences that do not appear in parallel fragment written on other artifacts. For example, for fragment F.1 the number *VI* in line Gr1 means that in this place there is a sequence of six glyphs that are absent from parallel fragments in other texts.

N°	Line	Barthel	P&P	N°	Line	Barthel	P&P	N°	Line	Barthel	P&P	N°	Line	Barthel	P&P
1001	Ev06	034-	34	1051			34	1101	Ev08	073.	700	1151	Ev08	095-	95
1002	Ev06	515-	38	1052	Ev07	509-	10	1102	Ev08	006-	6	1152	Ev08	326-	200
1003	Ev06	040-	41	1053			10	1103	Ev08	700-	700	1153			61
1004			10	1054			400	1104	Ev08	022-	22	1154			6
1005	Ev06	670-	660	1055			2	1105	Ev08	022-	22	1155	Ev08	019-	22
1006	Ev06	002.	2	1056	Ev07	062?.	62	1106			10	1156			3
1007	Ev06	108a (**6-**)	62	1057	Ev07	004(**062.**)	1	1107	Ev08	305.	200	1157	Ev08	057-	41
1008	Ev06	001(**22.**)	22	1058	Ev07	009-	9	1108	Ev08	053-	53	1158			63
1009	Ev06	062-	62	1059	Ev07	092-	280	1109	Ev08	022f.	22	1159	Ev08	019-	22
1010	Ev06	200.	200	1060	Ev07	001-	1	1110			3	1160			3
1011	Ev06	022-	22	1061	Ev07	092-	280	1111	Ev08	010-	10	1161	Ev08	107-	48
1012	Ev06	010.	10	1062	Ev07	009-	9	1112	Ev08	022-	22	1162	Ev08	019*	22
1013	Ev06	110-	62	1063	Ev07	092-	280	1113	Ev08	022-	22	1163			3
1014			41	1064	Ev07	005-	5	1114	Ev08	755-	730				
1015	Ev06	400.	400	1065	Ev07	092-	280	1115	Ev08	099-	99				
1016	Ev06	065-	66	1066	Ev07	005-	5	1116	Ev08	755-	730				
1017			6	1067	Ev07	092-	280	1117	Ev08	001(**050-**)	1				
1018	Ev06	013-	1	1068	Ev07	001-	1	1118	Ev08	046-	45				
1019			6	1069	Ev07	739-	730	1119	Ev08	073.	700				
1020	Ev06	400.	400	1070	Ev07	244.	240	1120	Ev08	006-	6				
1021	Ev06	065-	66	1071			6	1121	Ev08	522f-	99				
1022	Ev06	053-	53	1072	Ev07	003-	3	1122	Ev08	050-	50				
1023	Ev06	006.	6	1073	Ev07	044?.	62	1123	Ev08	022f-	22				
1024	Ev06	001-	1	1074	Ev07	009-	9	1124			3				
1025	Ev06	006.	6	1075	Ev07	092-	280	1125	Ev08	055b-	6				
1026	Ev06	001*	1	1076	Ev07	022-	22	1126	Ev08	590.	200				
1027	Ev07	566s-	280	1077	Ev07	092-	280	1127			9				
1028			69	1078	Ev07	090f-	280	1128	Ev08	001-	1				
1029			6	1079	Ev07	092-	280	1129	Ev08	755-	730				
1030			10	1080	Ev07	386.	380	1130	Ev08	459-	280				
1031	Ev07	074-	62	1081			6	1131			280				
1032	Ev07	035-	34	1082	Ev07	074-	74	1132			6				
1033	Ev07	070-	70	1083	Ev07	755-	730	1133	Ev08	379-	380				
1034	Ev07	035-	34	1084			6	1134	Ev08	006.	6				
1035	Ev07	400-	400	1085	Ev07	298-	280	1135	Ev08	077-	44				
1036	Ev07	035-	34	1086			6	1136			62				
1037	Ev07	071.	71	1087	Ev07	020-	2	1137	Ev08	202s-	200				
1038	Ev07	065.	66	1088	Ev07	079.	95	1138			62				
1039	Ev07	071-	71	1089	Ev07	010-	10	1139			10				
1040	Ev07	035-	34	1090	Ev07	079.	95	1140	Ev08	739 (**67.**)	730				
1041	Ev07	010.	10	1091	Ev07	010-	10	1141	Ev08	006-	6				
1042	Ev07	067-	67	1092	Ev07	001-	1	1142	Ev08	020-	2				
1043	Ev07	035-	34	1093	Ev07	001*	1	1143	Ev08	002-	2				
1044	Ev07	276.	380	1094	Ev08	200.	200	1144	Ev08	068.	67				
1045			6	1095	Ev08	007-	7	1145	Ev08	010-	10				
1046	Ev07	076?-	76	1096	Ev08	073.	700	1146	Ev08	077.	44				
1047	Ev07	188-	200	1097	Ev08	006-	6	1147			6				
1048			34	1098	Ev08	001(**073.**)	1	1148	Ev08	254-	240				
1049			10	1099	Ev08	006-	6	1149			6				
1050	Ev07	031-	22	1100	Ev08	011-	1	1150	Ev08	055b-	6				

Appendix 3. – Keiti and other texts: the inventory of parallel fragments[2]

F.1 (beginning)

Er2																	
Er2	16	*II*	70														
Er3																	
Ev6																	
Er7					400	200		901	62	400	901		99		2		10	7
Hr8	16		70		400		62	901	62	400	901		99		2	53	10	7
Pr7	16		70			95			62	400	901	62	99		2		10	7
Gr1													99	*VI*	2	3		
Sa4	16		70	16														
Sa3	16		70									45	99	*IV*	2	3		

F.1 (end)

Er2						660	1	63	62
Er2	63	2	38						
Er3	63	2	38						
Ev6			38	41	10	660	2		62
Er7									
Hr8									
Pr7									
Gr1			38	41		660	2		62
Sa4	1	*III*	38	41	10	660	2	63	62
Sa3									

F.2

Er3	71	66	71
Ev7	71	66	71
Er8	10	66	10
Br8	71	66	10
I9	71	66	71
I9	71	66	71

F.3 (beginning)

Er4	380		6	3	2	1	2	8	400	10		10	660	53	9	2	41	9	2	9
Ab 5-6	200	61	6			1		8	400	10	62	60	660	53	9	2	41	9	2	9

F.3 (end)

Er4	730		27		6	280	4	10	400	22	380			
Ab 5-6	41	6		700	6	280		10	400		200	6	3	700

F.4 (beginning)

Er4	10	10	200	6	48	74	4	8	45	7	1	200	41	61	48	200	59
Bv11		10	280	6		74	4	8	45	7	1	200	41	61	48	380	

F.4 (end)

Er4	44	7	380		44	720		400	400	10	62
Bv11	44	7	200	59	44	730	10	400	400	10	62

F.5

Er5			200	53	200		53		200	53	16	53	16
Hv6			200	53	200		53		200	53	16		
Pv8	6	6	380	53	380	61	53	61	380	53	16		

F.6 (a part)

Er7-8	91	8		9	91	8
Ab8	91	8	91	9		

F.7 (beginning)

Er9-Ev1	1		9	730	50	10	5	2	45	1	901	400	400		901	700	280
Ca1	1-62		9	730	50	10-2	5	2	45	1		280		69		700	280
Hr1	1	200	9	730	50	10	5	2		1		200	200	69	901	700	280
Pr1	1	200	9	730	50	10	5	2		1		200	200	69	901	700	280
Ev1			9	4-6	50	1	5	2									
Na5										400	901	200	200			700	280
Ev6																	
Ra 5-6	1	200-1-1	9	730	50		5			1	*II*					700	280-6
Sa7	1		9	730	50												

F.7 (end)

Er9-Ev1		1	7					22-2	34	2		1	2	34			
Ca1	400	1	7	400-*III*	1	280	1	*VIII*				1	2	34		2	34-3
Hr1		1	7	6-200	1	280	1				66	1					
Pr1		1	7	6-200	1	280	1				66	1					
Ev1																	
Na5		7	1	400-*III*	1			2	34	2	66-*II*	1	2	*III*	1	2	34
Ev6								2	34	2					1	2	34
Ra 5-6	400-6	1	7	400													
Sa7																	

F.8 (a part) (beginning)

Ev6		240	6	62	27								6	44	34	4	99			
Hv12	6	240	71		27									44	34	4	99			
Bv12		240			27	700	6									4	99			
Gr2	62	380	6			700	6	700	400	4	400	10	6			4	99			
Kr3	62	380	61			700	6	700	400	4	400	10	6			4	99			
Aa2	22	240	63	5										44	34		99	1	7	4
Sa2	3-41	240	63		27								6	44	34		99	1		
Aa2	22	240	63	5										44	34		99	1	7	4
Ab8		380	61-61		27							27	6							

F.8 (a part) (end)

Ev6	700	400	59	200	61-6	4						4	34-4			
Hv12	700	400	59	200	61	4	6	200	61	66	59	4	34			
Bv12	700	400	59	200	61	4	6	280	6		59			700	6	
Gr2	700	400	59			4	6			66				41	6	
Kr3	700	400	59			4	6			66				41	6	
Aa2		400														
Sa2																
Aa2																
Ab8	6-700-6	400	59													

F.9 (beginning)

Ev2			1		71	44	27	700	62	280	6	6	2	71	61	*V*
Na2	200-6	25	1		71	44	25	700		280	*IV*	10	2		61	
Cb3	380		1	1	71	44	27	700								

F.9 (end)

Ev2	6-6	48	*II*	200	*II*	380	1	730	400	400	4
Na2	6	48	*II*	200	1	380	1	*IV*	400	400	4
Cb3											

F.10 (beginning)

Ev2					380		1		400			9	6	400
Na4	380	69			380		1	52	400	901		9	6	400
Ab3	380	69	6	62	730	62	10		400	41	200	9	10	
Ab3														400

F.10 (end)

Ev2	400			9		380	1							
Na4	400	901		9	6	380	1	52	200	70	6	74	6	200
Ab3		22	200	9	22					70				
Ab3	400	22		9	22					70	62	999	6	

F.11

Ev2-3	380	1	200	6	10	2	1		7		200	61	6	380	1	70	41	95	3
Ab8			240	6		2	1	400	7	*IV*	240		6		1	45	4	95	
Aa8											240				1	45	4	95	

F.12 (beginning)

Ev3	380	1	7	67	10	3	67			660	10		1	10	660		700	69
Ev6			7	67	10	3												
Cb2	380	1		67	10	3	67		730	6-660			1	6	400	69	700	
Ra6	200	1	7	67	41	3	67	41-3	200	660			1	6	400	69	700	
Ab4		1-52	7	67	10	3	700-67			10-660			1				700	69
Hv12		1-3	7	67	22	3												
Ca 2-3	380	1		67	10	3	67	1										
Gr2-3			7	67	10	3	67		660	660	10	660	1	10	400		700	69
Kr3			7	67	10	3			400			660	1	6	400		700	69
Sa1	380	1		67	10	3	67			660	62		1					
Rb6			7	67	10	3												
Cb12			7	67	22	3												
Ab3																		

F.12 (end)

Ev3	380	1		10	240		22	3			4	4
Ev6					240	6						
Cb2	380	1										
Ra6												
Ab4		1	52		*VI*							
Hv12		1		6	240	71						
Ca 2-3	380	1	3-22	6	240	6	63					
Gr2-3	380	1	3									
Kr3	380											
Sa1				6	240	6						
Rb6												
Cb12												
Ab3				6	240	6	22	3	22	3	4	4

F.12 (end)

Ev3																	380	1	
Ev6																			
Cb2																			
Ra6							200	9	10	5	62-10	280	730	59	700	69		1	
Ab4	400		9	1	3	10	700	9		5			66		700	69		1	52
Hv12																			
Ca 2-3										5							380	1	3

Gr2-3	400	62	9-*V*	1	3	10	200	9		5	999	280	730	59	69-700		380	1	3
Kr3	400	62	9			10	200	9		5	999	280					380	1	

F.13 (beginninig)

Ca14				9	1	6	48	3	1	6-*IV*	380	1	280	1			280	2	280-280	1
Ev4	380	1	62	9	1	6	48		1	61	380	1	280	1			280	2		1
Ev5	380	1	62	9		6	48	10	1	61										
Gr5	380	1-3	62	9	1	6	48		1		380	1-3	280	1	99	61	280			1-*III*
Kv1-2			62				48						280	1	99-6	61	280			1
Na3	380	1									380	1-52	280	1			280	1	280	1

F.13 (end)

Ca14	280	660-660-*VII*	1	3				41	62	1	3-34-3	3-1	3-2-3		1-52	3	1	1	62			
Ev4	380		1	3	1	3		41	62	1	3-1-3	1	61	200				1	62			99
Ev5														380	1							
Gr5	280													380	1	3	1	1	62	1	3	99
Kv1-2														380	1	3		62-1		1	3	99
Na3		660	1		1	6	99	1	62					400					62	1		99-6-1

F.14

Ev5	380	1	200	10		2	1	7	280	62	63
Ca3	380	1	280	6	6	2	1	7	280		

F.15

Ev5	200	901	41	700	6	53
Na4	200	901	41	700	6	53

F.16

Ev5	380	1		91	3	280	3	6	200	69	1
Kv4	380	1	3	280		66	3		280	69	1
Gr7	380	1	3	91		730	3		240		1

Fr.17 (extract)

Ev5-6				8	8	**2**	**2**	4	3
A (many times)		**2**	**2**	8	8			4	
Ra7 (twice)	7	**2**	**2**	8	8			4	
Sb2	7			8				4	

F.18 (beginning)

Ev7	280	69	6	10	62	34	70		34	400	34	71	66	71	
Nb1						34		400	34	400	34				*IX*

F.18 (end)

Ev7	34	10	67	34	380	6	76	200		34	10	22	34	10	10	400	2		62	1	9			
Nb1	34			34	200	10		240	10				34	10	3		2	6	62	6	9	10	3	2

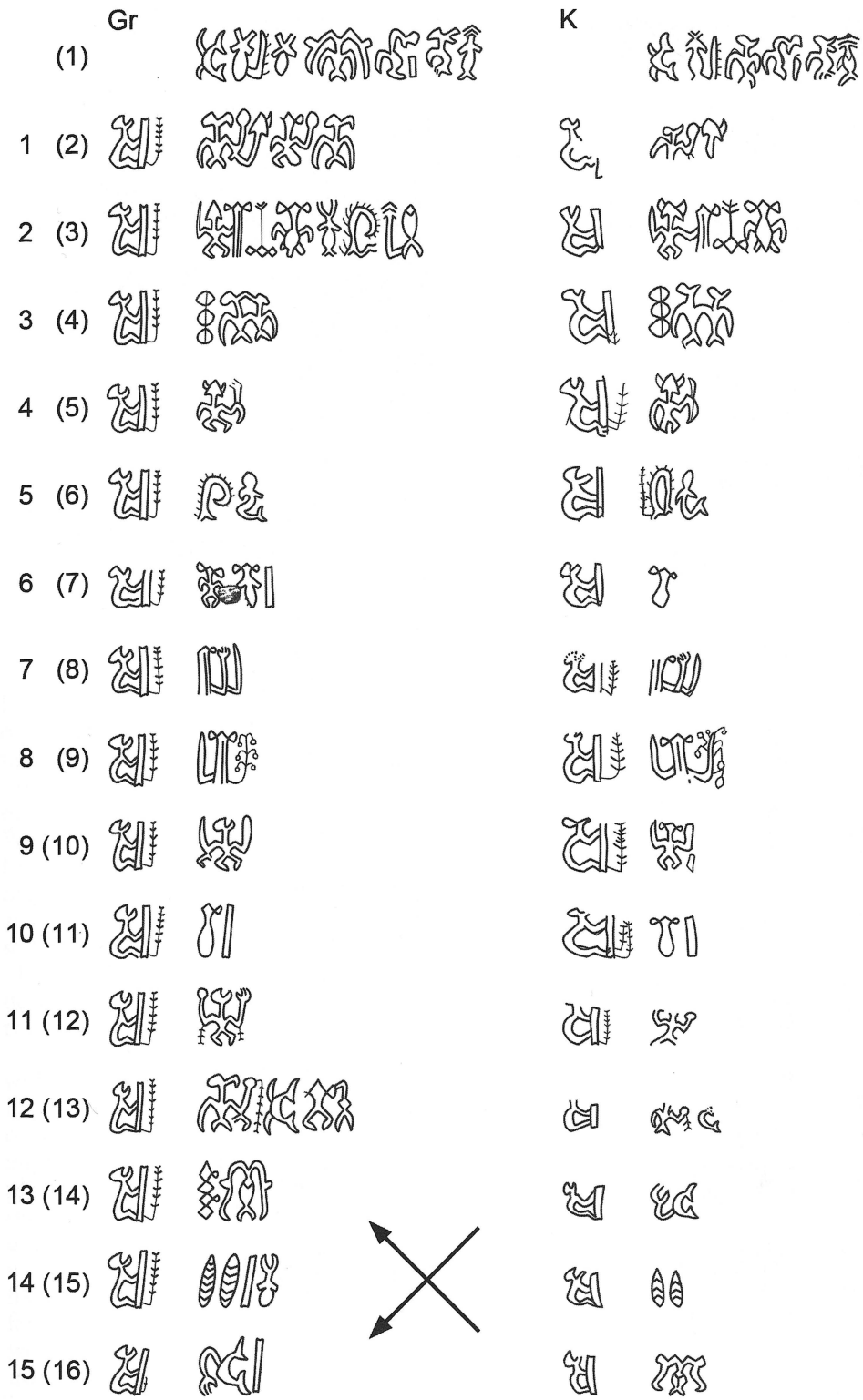
F.19

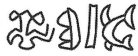
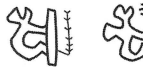
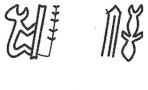
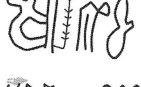
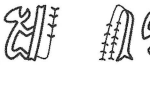
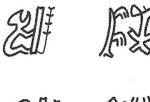
Ev7	280	22	280			280		280	380	6	74							730			6	280	6
Gv3	280	22	400	200	76	280	70	280				400	200	10	14	400	76	730	44	3	3	280	3

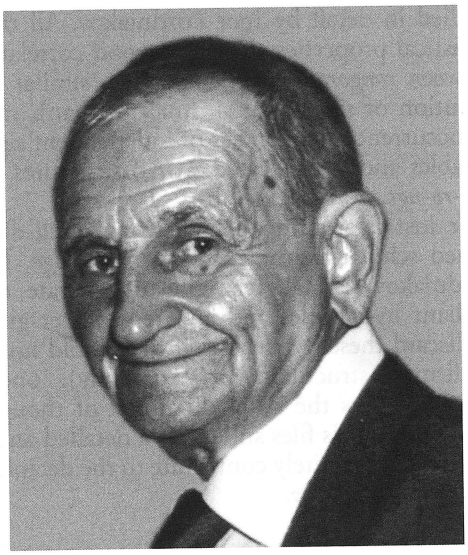
F.20

Gv8	6	200	9	1		730					280	280					6	380	6	44	62	200	62	10
Bv11	6	200	9		*IX*	730	380	730	4	52	280	280	200	280	280	44	62	380	10	44	62	380		10

Appendix 4. – *Sequences of blocks delimited with ligature 380.1 in parallel texts Gr and K*



	Gr	K (continued)
16 (17)		
17 (18)		
18 (19)		
19 (20)		
20 (21)		
21 (22)		
22 (23)		
23 (24)		
24 (25)		
25 (26)		
26 (27)		
27 (28)		
28 (29)		
29 (30)		
30 (31)		
31 (32)		



A word of dedication

Igor Konstantinovich POZDNIAKOV
(1/06/1927-16/01/2010)

Recently I lost my father and coauthor, Igor Konstantinovich Pozdniakov. He was working on decipherment of Easter Island script for more than a quarter of a century.

As a boy, he survived by a miracle the Siege of Leningrad (1941–1943). After the Second World War Igor became a naval officer. In 1963 he obtained Ph.D. diploma on phase measurements at the Research Institute for Metrology and some years after he became a director of Research Institute for Scientific Equipment.

In 1984 my father started active research on decipherment of the Easter Island script, and this was the start of our joint work.

At that time we had a Soviet computer «Iskra» with 16 kilobytes of RAM. On this computer I.K. Pozdniakov started to study the distribution of signs in the *rongorongo* texts. It is worth saying that in those times the computers were completely different from the multi-processor workstations of today. For example, to save the files one should use a common tape recorder, which was painfully slow and could only manage small files. As computers were gradually improving, my father developed hundreds of files addressing a wide spectrum of statistical issues that could be useful for the decipherment. I think that the true importance of his studies will be understood only when the Easter Island script will be deciphered. I am sure that the decipherment will show that my father was many times close to the correct solution, or even discovered correct readings for many signs, but did not have a chance to complete his monumental task.

After publication of our joint paper, we heard many critical comments saying something like: «if the statistical characteristics of the *rongorongo* signs and the syllables of the Rapanui language coincide so well, why did not the authors come to the decipherment for such a long time»? My father used to answer this question: «Finally, it is not so bad to remain the only ones who still have NOT deciphered *rongorongo*». Fortunately, this is not quite correct: there are other scholars who delve into meticulous and thorough work on *rongorongo* and do not wait for any cosmic revelations – these are, for example, Jacques Guy, Paul Horley and some other specialists.

My father was much annoyed by the comment repeated many times by Richard Sproat: "Pozdniakov would appear to have merely rediscovered the Zipf's law (well, not quite since the populations of syllables are too small for the curves to be truly Zipfian)". This misleading critique can even be found in the Wikipedia: «the results from the frequency distributions are nothing more than an effect of the Zipf's law, and furthermore that neither *rongorongo* nor the old texts were representative of the Rapanui language, so that a comparison between them is unlikely to be enlightening». I.K.Pozdniakov had several good replies for a rebuttal of Sproat's critique:

1) The pronounced similarity of usage frequency distribution of the *rongorongo* signs (according to our catalogue) and the Rapanui syllables. As Sproat briefly mentions, this distribution has nothing to do with the Zipf's law at all. Look how enlightening the comparison is: the most frequent hand sign 6 covers about 10% of the Easter Island texts, like the most frequent syllable **A** of the Rapanui language. The similar distribution curves for signs and syllables are actually quite sufficient. These two curves would not coincide if we tried to compare *rongorongo* with the syllables of any unrelated languages – let it be Russian, Wolof or Abkhazian. For example, Russian allows combinations of several consonants; as a result, the number of possible syllables is so great that none of them could have the occurrence of 10%. Thus, if we plot an (analogous) distribution curve for Russian syllables, it will be far lower and flatter than the distribution of the Rapanui syllables. Of course we checked this for different languages before the publication. Sproat's comparison of the occurrence distribution of the syllables from the short Rapanui text *Apai* with that of English letters forming first 12,000 words of Genesis is pointless, because comparing a syllabary to an alphabet is senseless. The curve characterizing English letters obviously goes below the curve for the Rapanui syllables in the plot supplied by Sproat, showing that his "reference"

English system with capital and small letters and punctuation marks contains a larger number of elements, which is reflected by their lower usage frequencies. I think that the similarity of the distribution curves for the *rongorongo* signs and the Rapanui syllables proves that the structure of the Easter Island script – with its phonologic glyph set and phonotactic rules – is remarkably similar to that of the East Polynesian languages. It is also important that the hypothesis about the predominantly syllabic nature of *rongorongo* clearly explains that glyph ligatures represent multisyllabic words, and that spaces between the glyphs actually separate these words. If we treat *rongorongo* as a logographic system, we will not be able to explain the function of spaces.

2) The Zipf's law is completely unrelated to other statistical properties that had been studied in detail by Igor Pozdniakov. All these statistical properties also show good correlation between *rongorongo* and Rapanui – similar distribution of signs (initial, final, median), similar occurrence frequencies of independent signs, syllables and reduplicated ABAB structures (*ro-ngo-ro-ngo, a-ku-a-ku*), etc.

We lost a prominent and strongly self-disciplined scholar in the field of *rongorongo*. Igor Pozdniakov had a great gift to generate new brilliant hypotheses and an even greater gift – to discard these hypotheses if they could not be confirmed (structurally or statistically): one of his values was the strict discipline of thought. Hundreds of his files still await a detailed analysis and will definitely contribute to the decipherment of *rongorongo*.