

Qualitative and Quantitative Validation of *Rongorongo* Glyph Strings on Easter Island Artefacts

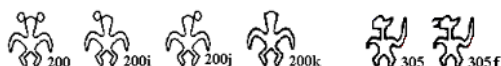
Introduction

-*Kohau rongorongo* (RR) is the undeciphered signwriting of the indigenous peoples of Rapa Nui - remote South Pacific Easter Island (land of the *mo'ai*: monolithic human-figure stone statues).

- Most RR scribes and cantors were kidnapped or later perished in the genocide and disease, accompanying Rapa Nui's colonization.¹ By June 1869, when Bishop Tepano Jaussen discovered, subsequently studied, and publicized RR,² it is presumed that few interpreters remained alive.

- RR contains about 120 unique (base) characters depicting everyday Island objects, creatures, and astronomical signs. The bases may be linked /fused together within the inscriptions, producing hundreds of different compound forms.³

- Thomas S. Barthel⁴ created a widely used and subsequently modified Catalog, which classifies the RR glyphs. Catalogue Numbers run between 1 and 799 (#999 added later). Alphabetic-like suffixes 'i', 'j', 'k' denote locations of "lozenges" (perhaps "eyes" or "ears") attached to glyphs (see below). Suffix 'f' denotes glyphs having attached hair-like follicles.⁵



Barthel Cataloguing System (based upon glyph motif)	
Ref. Barthel, Thomas. 1958. <i>Grundlagen zur Entzifferung der Osterinselschrift</i> . Hamburg: Cram, de Gruyter.pp. 40-41.	
Catalogue Numbers	Category of Shape
1 thru 99	Frequent geometric shapes
100 thru 199	Infrequent or personalized geometric shapes
200 thru 299	Hominid shapes with fronting heads
300 thru 399	Hominid shapes in profile, gaping mouth
400 thru 499	Hominid shapes profile, gaping mouth, expressive body (pantomiming)
500 thru 599	Various head shapes
600 thru 699	Heads of birds
700 thru 799	Shapes of other animals

-When cataloguing glyph sequences, distinct glyphs are separated by dashes '-'. Horizontally linked glyphs are separated by '.'. Vertically linked glyphs are numbered top-down (traditionally read bottom up) and separated by ':'. RR glyph numbers or sequences are here introduced with ' } '.

-An authentic RR text is the "creative transcription by a RR expert" of "a sequence of two or more glyphs, fulfilling a communicatory function".⁶ (I will accept as authentic, compositions of an RR 'journeyman' also).*

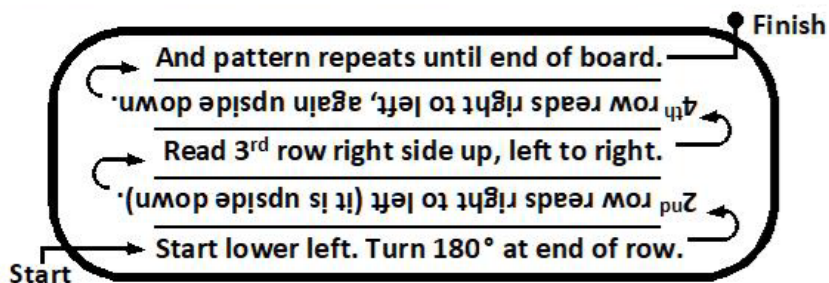
- Authentic remnants (of RR) are documented upon 25 or 26 wooden slabs or objects, typically in tidy, seamless (unpunctuated) rows. Artefacts are designated by capital letters or common names: Rapanui words such as C-"*Mamari*" (egg) or specimen domicile (viz. I-"Santiago Staff").⁷ The RR corpus comprises approximately 14,000 signs.

-Inverse boustrophedon (ox-turning) format is the standard for RR artefacts of trusted provenance.⁸ Inscriptions are read beginning bottom and thence proceeding left to right with a 180° board turn around at line end to properly orient the next line for continuing (left to right) reading.[Ⓢ]

* Solo glyphs are found on human skulls and wood and stone carvings. Some of these might also be of epigraphic utility if their glyph is contextually relevant (a contemporary example would be the metric size indicators [7, 8, 9, . .] upon modern Allen keys).

[Ⓢ] Forgers may also craft fake RR artefacts in reverse boustrophedon text layout to validate their wares. The famous Mazière tablet would be an example of such a deception. (Ref. Mazière, Francis. 1968. *Mysteries of Easter Island*. Trans. by Wm. Collins Sons. New York: W. W. Norton, Company, Inc. With photographs by the author, p. 64. Originally published as *Fantastique île de Pâques: Des yeux regardent les étoiles...*, Robert Laffont, 1965.)

Right: The inverse boustrophedon text arrangement - standard layout for RR tablets of trusted provenance.



-Many stones, boards, or sculptures, adorned with RR glyphs, have been created for sale to island visitors or tourists. Production of such artefacts continues to this day. RR forgeries might be innocently imitated or purposefully deceiving.⁹ However, those parts of imitations, which quote directly from authentic (but now lost) texts, should be appended to the validated corpus. In view of this, some obviously modern productions are analyzed here to determine if their RR-like inscriptions reproduce authentic but otherwise unknown texts.

Methodology

Six *rongorongo* artefacts are evaluated for authenticity: three short inscriptions and three longer ones (>45 characters).*

-The metrics of evaluation are **provenance and production technique** (indigenous or modern), **calligraphy** ('handwriting' quality), **vernacular** (glyph vocabulary), **conformity to Zipf's law** (character frequency analysis), **internal verse pattern**, and assessment of item-specific **special features**.

- **Verse patterns** are found in all authentic RR inscriptions longer than 10 characters be it by restating stanzas, or parsing sections with recurrent single glyphs, bigrams or trigrams. Sproat¹⁰ provides an algorithm-based list including intra board repetitive (or near repetitive) phrases of five glyphs or more. Horley¹¹ presents sketches of A, B, C, D, E, G, H, N, P, R, S *rongorongo* boards showing locations of repeating glyph patterns (*n.b.* omitted board Q is a near-copy of boards H and P). Barthel¹² and Guy¹³ thoroughly discuss many of the different verse patterns, which are found in RR.

-Lengthy RR inscriptions may be related to Zipf's general function of rank frequency distribution for languages (**Zipf's Law**).¹⁴ If the RR is underpinned by natural language, then successively ranked (highest to lowest) glyph frequencies should be linear or near-linear when plotted as a log-log relationship.

-Pozdniakov,¹⁵ theorized RR to be a glyph syllabary and generated a rank-frequency graph comparing the classical poem *Apai* (in old Rapanui language) to Thomson's¹⁶ traditionally associated glyph inscription upon the *Keiti* Tablet. The plotted data sets corresponded almost exactly.

-Horley¹⁷ compared rank frequencies for Barthel's RR sign inventory, and Rapanui folklore manuscripts. both datasets conformed well to Zipf's Law.

-Caution: ". . . many alternative processes such as music and visual art also have stochastic component so conformity to Zipf's law is necessary but not sufficient proof of language" (my underlining).¹⁸

* Inscriptions of greater length would be desirable and specimens of richly diverse provenance too (a couple of these artefacts were first reported by T. S. Melka and R. M. Schoch). Perhaps one day, additional materials of extended length will be happened upon, warranting careful analysis. The material chosen here is what it is, and what matters is the expansion of the epigraphic corpus through assiduous scholarship, irrespective of each artefact or its pathway to discovery.

The San Diego Tablet (SDT)

FIGURE 1: THE SAN DIEGO TABLET (SDT)

Reprinted with permission of the anonymous SDT owner. Photograph Courtesy Robert Schoch and Tomi Melka A "Sacred Amulet from Easter Island – 1885/6 –": Analyzing Enigmatic Glyphic Characters in the Context of the rongorongo Script. *Grapholinguistics in the 21st Century 2020 Conference*. [Online] Paris June 17th-19th 2020. Brest, France: Fluxus Editions.



Provenance and Production

- In 2016 the SDT was purchased at an antique and junk dealership in Prescott, Arizona.¹⁹ The proprietor appraised the tablet as “a curious piece of wood with some carvings on it, which he did recognize as from Easter Island, but no real value was attached to it.”²⁰ He reported having acquired the item from an old San Diego, California estate.²¹
- Melka and Schoch posit the SDT to possibly be the Calligan tablet²² (a specimen procured by Patrick John Calligan, mate on the 26 tonne *Caroline*, which went aground on Rapa Nui in 1873). Calligan later mailed the RR board to his wife in California, but the tablet disappeared after that.²³
- More than one researcher has searched for, or yet now continues seeking “lost” RR artefacts or even castings of artefacts.²⁴ Fischer,²⁵ for example, mentions another missing artefact, the so-called and apparently ‘misplaced’ / ‘lost’ “Barthel Tablet”. Most probably, such artefacts should be recognized as traditionally authentic if/when they are found.
- Possibly relevant to the SDT: sleuth work (albeit unsuccessful) by Fischer²⁶ and Meroz²⁷ did eventually trace the footprints of the Calligan Tablet as far as California—the same locale whence (according to the antique dealer) the ownership of the mysterious RR board originated.
- The SDT has dimensions: 16.7 cm long, 6.4 cm wide, and 1.4 cm thick. Most glyph heights range from 10.0 to 12.0 mm; A few leadoff glyphs are as small as 5.5 mm.²⁸
- One SDT side presents 5 lines of glyphs in inverse boustrophedon reading order. The other side is utterly damaged,²⁹ possibly the result of having been stored in damp soil, a “family storage cave” or a “rock hole”—cf. Honolulu B.3629 Tablet³⁰ or the Great Vienna Tablet.³¹
- Unlike several other RR boards, the SDT glyph lines are not fluted. There are traces of horizontal guide lines akin to modern lined writing paper.³²
- The SDT shows evidence of inscription by traditional methods, a strength in validating its authenticity. Per Barthel,³³ Fischer,³⁴ RR glyphs were often laid out first on banana leaves, scribed with a bone or pointed stick stylus between the leaf veins (just as one writes characters between the lines on a ruled paper sheet). Natural banana leaf vein spacing is between 10 and 15 mm,³⁵ the same as the height of RR glyphs upon surviving wooden specimens.
- RR copy was traced from leaf to wooden board surface using a sharp Obsidian flake. Deep pin holes were next punched into the obsidian etching. Lastly, a deep scoring was applied with a hafted shark tooth, following the pathway of the perforations. The following illustration shows specific indigenous tooling possibly associated with this production process: a bone awl and an obsidian graver or flake. Right: SDT glyph close up reveals deep perforations in some areas.



Artefact Photos reprinted with permission of anonymous owner. Photographs Courtesy of Robert Schoch and Tomi Melka - "Exploring a mysterious tablet from Easter Island: the issues of authenticity and falsifiability in rongorongo studies," *Cryptologia* (2020): Left – Figure 12; Right – Figure 11. DOI: 10.1080/01611194.2019.1706065.

Calligraphy

- Although the SDT glyphs are easily identifiable and better drawn than those of the other lengthy RR inscriptions studied here (*Warren Anderson* Tablet or *Madrid "Fish" Inscription*), Melka and Schoch nevertheless grade the caliber of SDT glyph drawing as close to the "*Verfallszeit*" (declining period).³⁶ They draw an analogy with the *London Tablet*,^{37,38} generally deemed to be an authentic, but late period RR inscription.

-The SDT incorporates several lengthy parallel curving lines. Horley,³⁹ scrutinizing textual corrections yet visible upon certain RR artefacts, noted that depictions of "*graceful anthropomorphic signs with long necks or curved backs were quite difficult*". Possessing just mediocre handwriting skill, I have determined that several of the more demanding glyph constructions (such as frigatebird heads and lengthy concentric curves) might nowadays be reproduced acceptably by importing them into a Computer Aided Drafting program and there redrawing or tracing.

Verse Patterns

-The First (bottom) SDT row is bounded at its initial and final ends by vertical-edge glyphs "i" and "||" respectively.⁴⁰ From a semiotic perspective these forms resemble barriers or fences. They may or may not add additional linguistic value. Be that as it may, the *prima facie* appearance of the first line is of similar verticals symbols bookending an enclosed text into a single section.

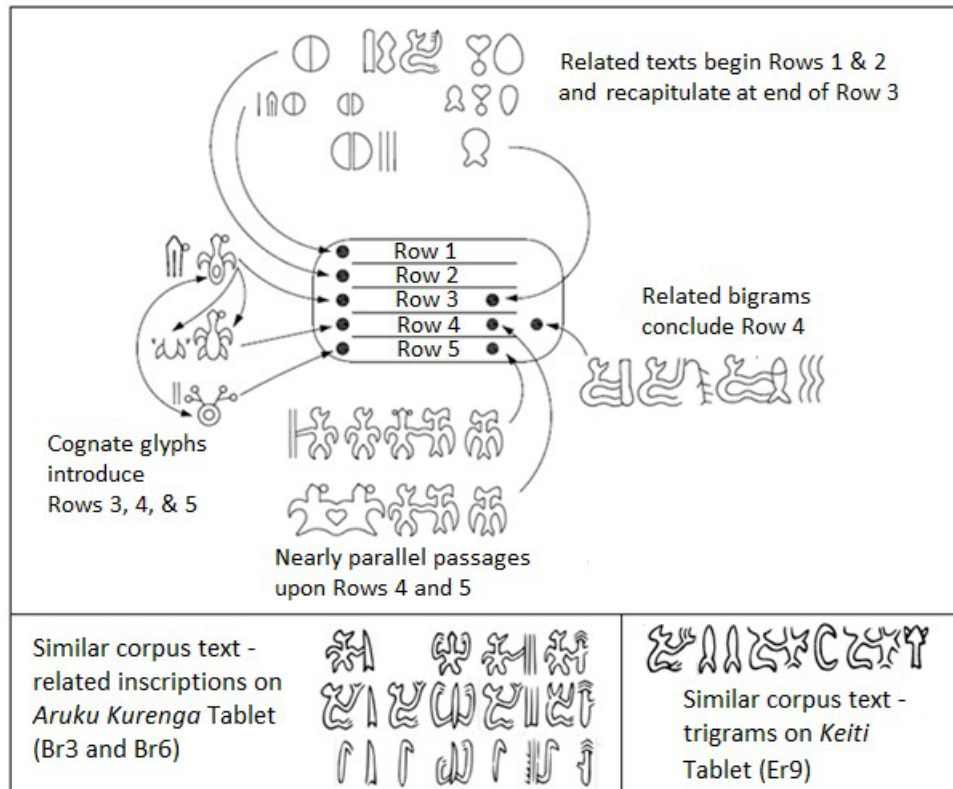
-Leadoff glyphs of Rows 1 and 2 are, moreover, nearly parallel phrases, suggesting that each row begins with a similar refrain. Row 3 recapitulates a version of this very same refrain into its concluding glyphs

-The third row seemingly progresses into Rows 4 and 5 since all three of these inscriptions show commonality amongst their introductory glyphs. The two full-belly *honu* ("sea-turtle"-like) forms, 𐎎𐎗 which introduce Row 4, appear to be cognate variants (perhaps antonyms) of the "hollow belly",^{42,61} 𐎎𐎗 at the beginning of Row 3. Furthermore, the 'hollow belly' detail within the hominid glyph introducing Row 3, is redrawn as the concentric circle 'bullseye' ① at the start of Row 5. Upon the SDT, the 'bullseye' and 'hollow belly' or full belly '*honu*' motifs occur only at the outsets of Rows 3, 4, 5: never elsewhere. This supports the hypothesis that these forms uniquely introduce each of the last three texts/rows.

-The SDT also presents 'bird-hominid' parallel passages and a grouping (Row 4) of three bigrams. The 'bird-hominid' inscriptions occur on both Row 4, and Row 5. The three bigrams extend to the end of Row 4 but do not 'wrap' to Row 5. Thus, even though Rows 4 and 5 appear to be closely related, there is a case for them being semantically independent. of each other.

-The inverse boustrophedon layout of the SDT hides its repetition patterns. Repeating phrases occur on adjacent lines: upside down one versus the other. If the SDT were spurious, one might expect the associable phrases to be displayed conspicuously, to satisfy the critical gaze of tablet examiners. This could be done by presenting the patterns right side up with respect to each other (on every other line).

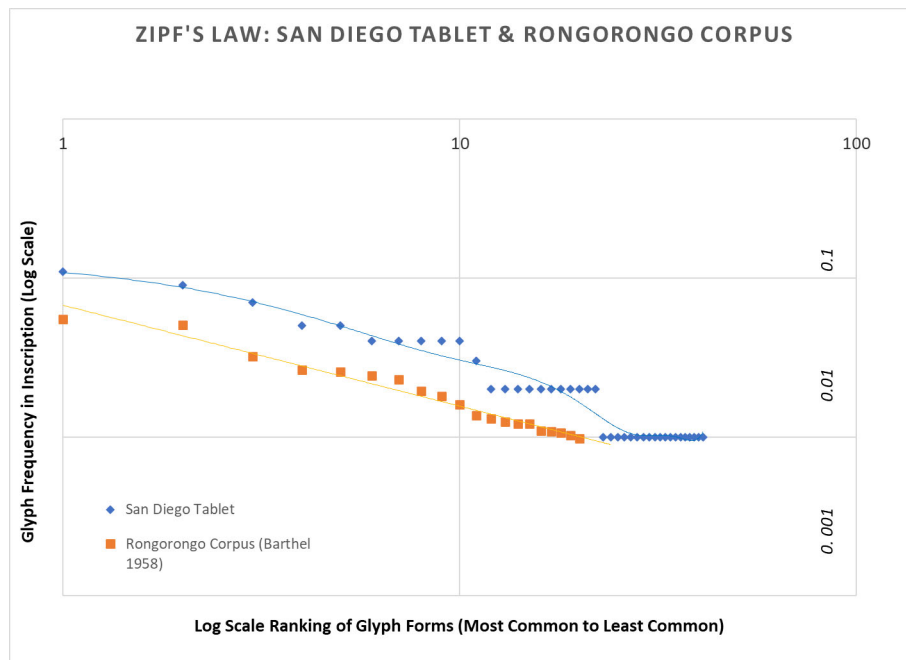
Morphologically Related Texts of the San Diego Tablet



-Because wood was scarce upon Rapa Nui,⁴³ a transcription of some master text would have been constrained by the dimensions of available clean boards. Consequently, the SDT text could not have been a direct row-by-row copying of some master manuscript. It has required intelligent editing.

Zipf's Law

-The 7th through 10th most common characters of the SDT are overrepresented (graph bulges upward in this area). This is, perhaps, due to their usage in restated phrases or in repeating of bigrams ((viz. the 'GD' form and the 200 hominid forms, respectively).



Vernacular

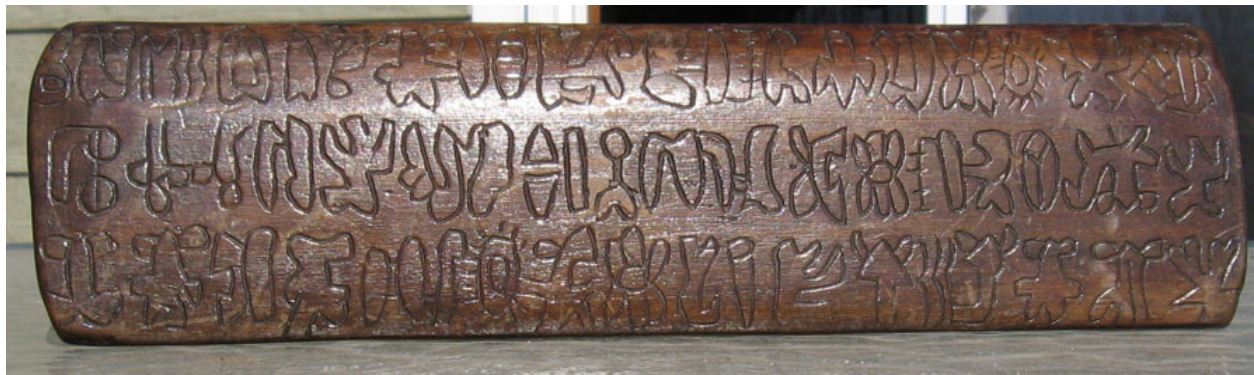
-Four of the ten most frequently used SDT glyphs (ʃ700, ʃ1, ʃ5, ʃ600) are also listed by Barthel⁴⁴ as being among the top 20 most frequently occurring signs within the classical corpus.

-The “cardioid” ♥ and “split circle” ‘OD’ glyphs are irregular and their usage is, perhaps, consistent with apparent novelty of subject matter upon the SDT or the vernacular style of the scribe. Moreover, such usage conforms to observable glyph selection processes across classical RR tablets. For example, the common ʃ76 “penis”-form⁴⁵ occurs 513 times⁴⁶ upon the Santiago Staff but not even once upon the oft-studied *Mamari* board. Upon a fake artefact, one might expect to find a very commonplace glyph vocabulary rather than a slightly idiosyncratic one.

Conclusion

The SDT scores favourably on many metrics of authenticity: familiar vernacular, elaborate display of verse patterns and development of bigrams, plus evidence of traditional board production technique. In one important area – provenance – the tablet is weak. In this regard the SDT is comparable to the ‘deemed-authentic’ Paris Snuffbox (cf. Barthel⁴⁷, Pozdniakov⁴⁸), which – according to its original owners – had been held in the family for 80 years (since approximately 1880) but lacked traceability to Rapa Nui prior to that. Moreover, the Snuffbox may have been inscribed using a steel tool, betraying a very later period of production, indeed. In the opinion of this author the SDT matches or exceeds the Snuffbox in all our metrics. Whereas the SDT may be a bit weak with respect to its glyph calligraphy, it is not markedly substandard. Considering all information at hand, the SDT should be acknowledged as an authentic RR artefact, whether made at some point during the late pre-missionary or early missionary times, i.e., pre-/post-1864/66.

Warren Anderson Tablet (WAT)



Warren Anderson Tablet a-Face



Warren Anderson Tablet b-Face

Photographs Courtesy Warren Anderson 2022.

Provenance and Production

Warren Anderson: “The board was part of the estate of my father, who died in 2005. He must have acquired it a long time ago – probably around 1960. It is an old piece so if it is a copy or a fake made for tourists it’s an old one”.⁴⁹

-If dated before opening of the Rapa Nui airport in 1967, the board may have been traded or sold to a crew member of one of the annual supply ships from Chile⁵⁰ or acquired by a visiting merchantman or member of a scientific expedition Island viz. Franco-Belgian (1934)⁵¹, Norwegian (1955-56)⁵² or Canadian (1964-65).⁵³

- Tablet dimensions 102 mm x 400 mm, glyph heights about 25 mm (probably not pre-drawn on banana leaves).

-WAT is atypical of RR artefacts in that its long edges are perfectly parallel indicating that the raw board was likely trimmed using a non-indigenous technology.

Imprint of Reinforced Banding



-There is an imprint of a reinforced strap between lines b2 and b3 (right side), indicating that the board may have been part of a packing crate. Use of polymer-reinforced strapping would preclude a board production date before the 1940s.

Vernacular

-6 of the 9 most encountered glyphs upon WAT – simple forms ʔ1 , ʔ2 , ʔ4 , ʔ5 , ʔ8 , ʔ10 - are also listed by Barthel⁵⁴ as being among the top 20 most frequently occurring signs within the recognized corpus. Glyph selection by the author of WAT tablet mirrors the vocabulary choices made by authors of classical RR artefacts.

Verse Structure

-Almost none of the WAT inscription has been parsed into short, concise, glyphic verses. In this respect the WAT differs from all known authentic RR inscriptions of significant length.

-There are three ʔ22 and two (morphologically similar) ʔ19 glyph-pairs spaced irregularly throughout the tablet.

-There are two widely separated occurrences of the common ʔ380.1.3 trigrams, a triad that that may have been used to parse glyph sections upon authentic boards (cf. Melka).⁵⁵ However, the ʔ1 glyph of the second trigram is poorly carved and might easily be mistaken for a ʔ22 .

Calligraphy

-Quality of glyph carving on the WAT is poor. Nowhere do the anthropoid types display arms or legs drawn attractively with gracefully curving concentric lines. Seated hominids show no outstretched leg - only blobbed torsos.

-It is impossible to distinguish between the high aspect ratio ellipses ʔ22 and the more generously proportioned (albeit rare) ʔ'big O' forms. Generally, the WAT appearance is of an artefact carved in haste with little display of the artistic beauty that is hallmark of classical RR and exemplified particularly by the *Aruku Kurenga* or Small Santiago boards.

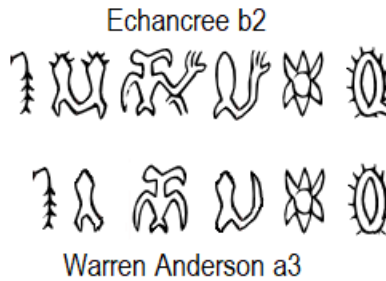


Other

-There are four unusual or fantastic glyph forms.

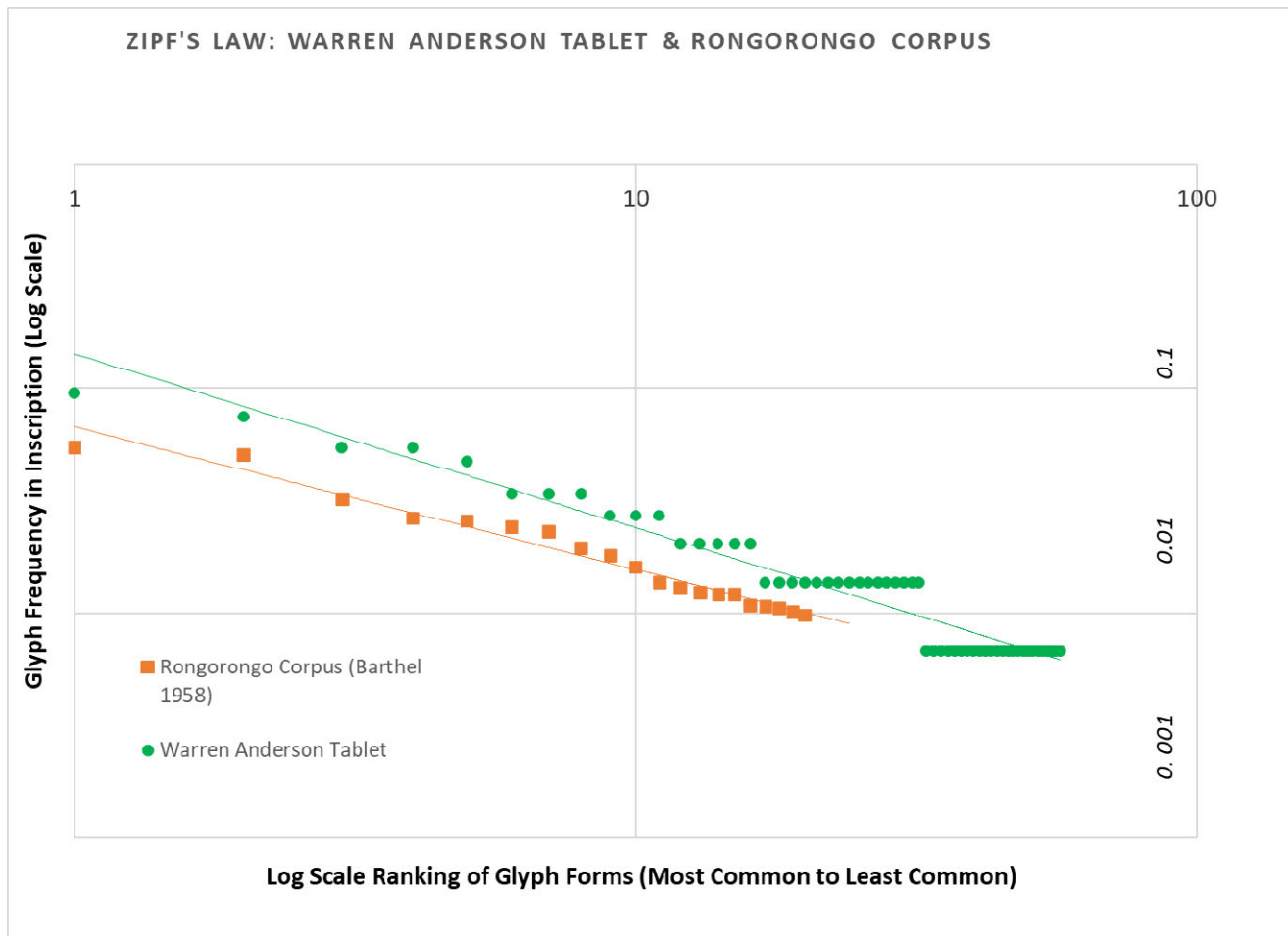
-The uncommon ʔ771 occurs twice: at the end of the first line and in second-last position at the end of the final (3rd) line. The first line ʔ771 is partially obscured - running off the board end - whereas the third-line form is fully visible. One would expect to find the full ʔ771 ahead of the partial copy, giving the board reader every chance to interpret the correct allograph of the rare form, when it is first seen.

-There is a 6-sign phrase on WAT a3 that seems to be a re-arranged excerpt from the *Échancrée* (notched) tablet Db2.



Zipf's Law

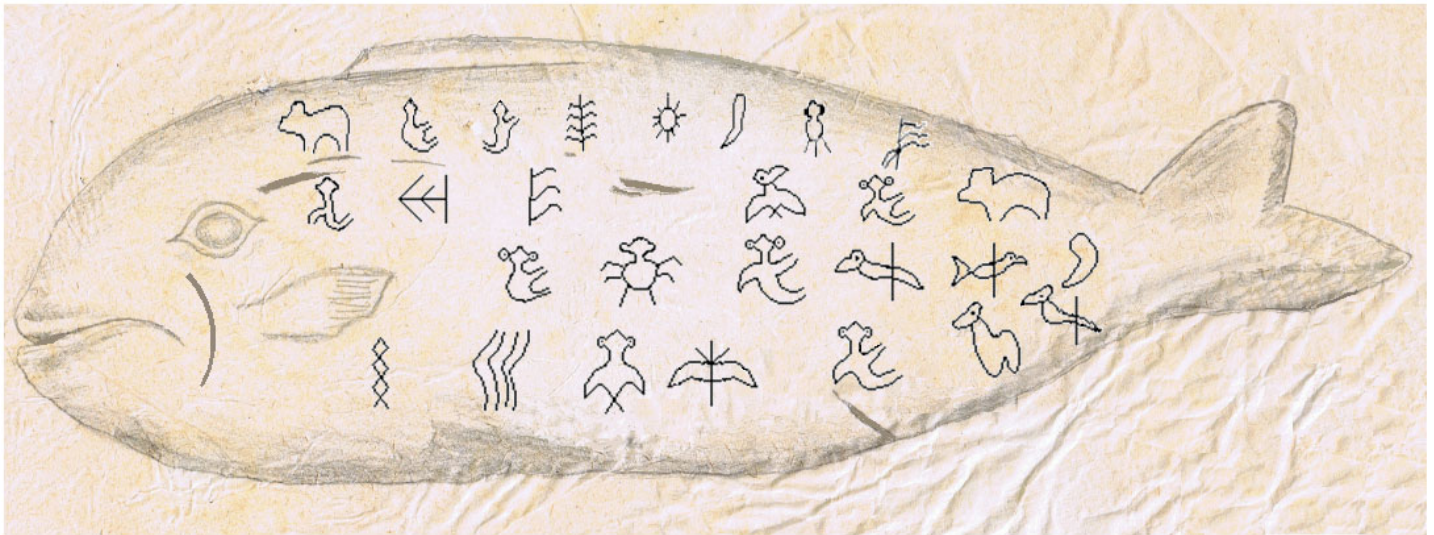
-Conformity to Zipf's law is good.



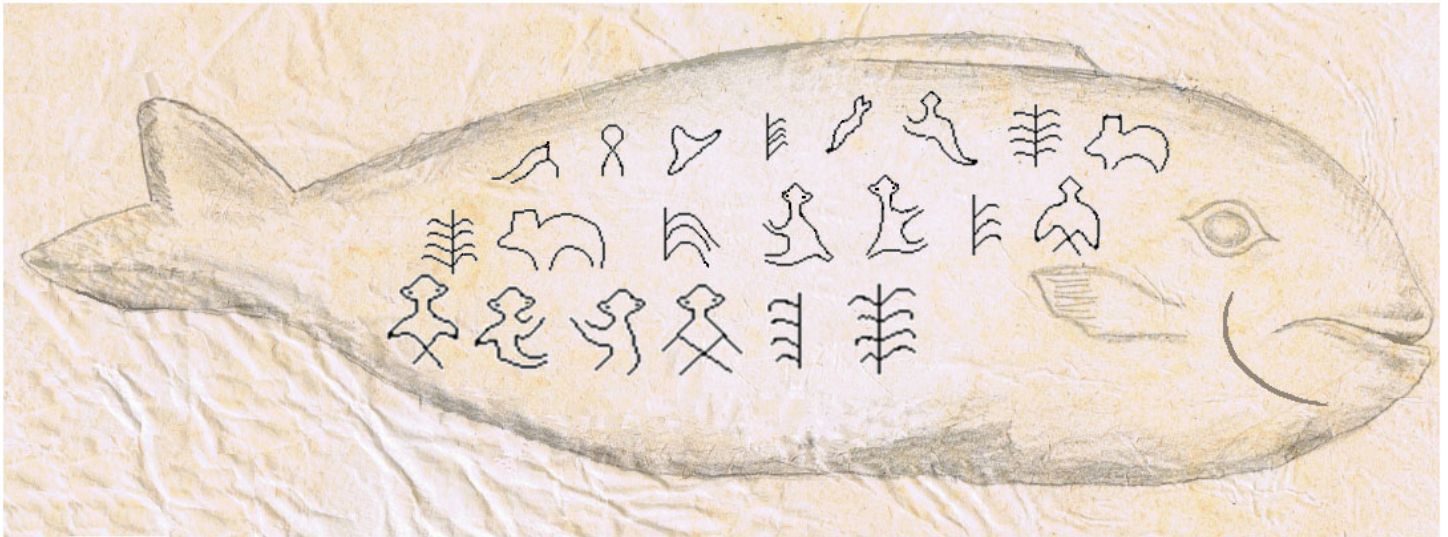
Conclusion

Conformance of the text to Zipf's law and correspondence of vernacular to other authentic RR artefacts is good. However, there remain serious issues with the WAT. The imprint of reinforced strapping tape (*circa* 1940s or later) on its "b" side precludes it from being a period piece. There is no internal verse structure, a usual hallmark of all other lengthy classical RR inscriptions. There is evidence for a short glyph section having been copied from text upon the *Échancrée* tablet. Given the conspicuously poor quality of glyph carving, it may be posited that the author of the WAT was etching in haste with probable goal of producing an artefact for sale and personal profit.

Madrid Fish (*Īka*) MFI



Madrid Fish Image - Side a



Madrid Fish Image – Side b

Artwork of Author. After photograph and sketches by Blanco, Francisco. 1996. A Fish (*Īka*) Tablet with Hieroglyphic Writing from Isla de Pascua Discovered in Madrid. *Rapa Nui Journal* 10(3). 57-59.

Provenance and Production

-The MFI is a fish shaped sculpture having - on each side - “an eye, mouth and dorsal fin. The tail is cut at an angle.” Glyphs are incised in 4 lines (27 signs) on the obverse side and 3 lines (21 signs) on the reverse. It has dimensions of 39.3 x 12.3 x 1.8 cm.⁵⁶

-Glyphs are laid out from left to right, exclusively right side up as opposed to inverse boustrophedon. this is a characteristic of the latter *ta’u* form of RR, produced after 1877.⁵⁷















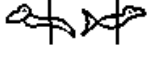








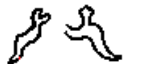
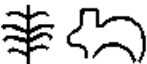
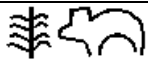





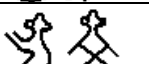

-The MFI is believed to have been carved between 1900 and 1920. It formerly belonged to Chilean president Arturo Alessandri Palma (1868 – 1950) who gave it to the present owners - residents of Madrid (Spain).⁵⁸ Fedorova⁵⁹ attributes authorship of the Madrid “fish” image to Tomenika* – an elderly Rapanui literate in the *ta’u* script (an imitative trade-driven form of RR created in the 1880s). Routledge, while visiting Easter Island in 1914 met and interviewed Tomenika

* If this determination is correct, then the latest reasonable date for the creation of the Madrid “fish” would be several years before Tomenika’s death in 1914.

during his last months of life. By then his intellect had faded: “most of what the old man knew he had forgotten, and what he dimly remembered he was incapable of explaining”.⁶⁰ Yet, if Tomenika had lived a normal human lifespan of 70 years (and Routledge does describe him as being “old”) then he would have been in his 20s when most of the last RR men died in the 1860s. There would have been ample years of youth for Tomenika to have gleaned information about RR. Even if he had been just a journeyman with respect to RR skills, his work would remain invaluable to modern epigrapher's (who, compared to former RR masters, yet understand very little of Rapanui's indigenous glyphic script).

Verse Pattern

- There is one reduplicated glyph-pair in the inscription.
- Irina Fedorova has proposed a translation (unverified) for the MFI.⁶¹
- Most glyph lines seem to present a single verse of a greater communication. Structurally, line b2 does wrap to the start of b3 (perhaps the text was pre-composed and later fitted to the confines of the sculpture).
- Verses appear to be laid out in a sequentially regular pattern with each line presenting one or more of a plant glyph, then a reclining hominid, and then a related hominid/zoomorphic pair.
- Certain (red underlined) plant signs at the start or conclusion of initial or final glyph lines seem to incorporate extra semiotic functionality, which could have been used to clarify the proper reading order for the inscription.

Side a Line a1							 (some before much following)
Line a2							
Line a3							
Line a4							
Side b Line b1  (some before)							
Line b2							
Line b2 and b3							 (well filled)

Vernacular

- No frequently occurring glyph upon the MFI is found within Barthel's list of the top 20 most common signs in the RR corpus.⁶² This indicates that the text on the “fish” image is different from the collective of recognized RR objects.
- We don't know the extent to which original RR glyph definitions have been modified in the *ta'u* script.
- In the late 19th century and pursuant to interactions with overseas visitors and settlers, Rapanui experienced lifestyle changes such as introduction of livestock and adoption of wood-framed housing. Some of the traditional glyph designs may have become dated and possibly replaced with new motifs.

Because many MFI glyphs are repeated to develop the verse structure on the board, the Zipf's Law graph exhibits curvature *versus* the corpus plot: the third through eighth most common MFI signs are overrepresented.



-Glyphs are drawn without an eye for artistry, with a few of them appearing as ‘fantastic’ forms: however, they are rendered just well enough to be traceable / decipherable.

The lovely verse structure of the MFI plus its semiotic direction markers intuitively of it containing an underlying communication. This supports Fischer's⁶³ hypothesis that the *ta'u* RR script may have been utilized as a form of writing in and of itself. If meanings of the glyphs of the MFI are similar to their equivalent classical RR forms, then the MFI may be a useful epigraphic reference.

A large, dark, semi-circular stone marker is mounted on a wooden post. The marker has a white title 'Hare Vaka' at the top and a row of Moai symbols below it. The symbols are arranged in a line, with some larger and some smaller, and are separated by vertical lines. The background shows a wooden fence and some greenery.

Hare Vaka





















This is the name Rapa Nui people called this house, because when completed it looks like an overturned canoe. This structure represents a scaled down model of those built in Rapa Nui. Traditionally these structures extended 30-60 feet. There are records however of hare vaka that measured approximately 100 meters or 328 feet.



9-430.76-670-256-44-? - ?- 1- 9-430.76-670-256-44-? - ?- 1- 9-430.76-670-256-44-? - ?- 1-

Provenance & Production

- An inscription on an information sign at the entrance to a replica of a Rapanui elliptical-like canoe house (*hare vaka, hare paenga*) (Polynesian cultural centre - Oahu, Hawai'i).
- No authorship information.
- Single line of 27 characters, each of approximately 35 millimeters height, painted on a reinforced plastic plaque.

Vernacular

- Conforms to classical inscriptions. Three of its 8 different glyphs (ʔ1, ʔ430, ʔ76) are listed among the top 20 most common signs appearing throughout the corpus. Indeed, ʔ1 and ʔ76 are the most frequently used glyphs of all.

Verse Structure

- The HPS inscription consists of one line of text containing three consecutive, identical 9-glyph verses.
- Single glyphs or bigrams may be duplicated three times or more, consecutively, in RR. However, much longer texts (*viz.* the 8-character repeating sequences of the *Mamari* “lunar calendar”) are never restated without variations.



Authentic Lengthy RR Sequences (*viz.* [black] *Mamari* “lunar calendar” signs) show variability (green forms) and are separated by disparate (purple) glyphs

Calligraphy

- Most beautifully drawn of the six artefacts investigated. Matches the standard of the best classical period pieces.

Other

- The three-verse set up of the glyph string intuitively of an invocation or chorus whereas the accompanying English description presents descriptive and technical data pertaining to the indigenous Rapanui *hare vaka* (houses). The RR string does not seem to be a translation of the companion English text). Pertaining to artworks, J. M. Eisenburg⁶⁴ cautions that “*monotonous repetition of elements - without a direct bearing on the theme*” can be an indicator of a spurious creation.
- The HPS decorative signage mostly copies a part of the Small Santiago glyph line up (Gv3). See the ʔ90 - ʔ430.76 - ʔ670 - ʔ256? - ʔ44 string (shown in purple) as it appears embedded in the Gv3 inscription.



- The ʔ99 HPS glyphs are incomprehensible. Moreover, it is unclear how the meaning of these irregular signs might be unravelled, given that a very different inscription occurs in their place, following the same preceding string, on Gv3.

Conclusion

The HPS is a simple transcription of Small Santiago v3 text, not a creative literary adaptation. The HPS passage is of no value to RR epigraphy.

The HPS is a forgery (or more generously, an artistic use of RR in modern context) presenting a short text copied from a classical RR object. When assessing artefacts for authenticity, it is vital to possess a thorough knowledge of the contents of the classical RR boards, or to be supported by an algorithm (akin to the one developed by Richard Sproat),⁶⁵ which can match newly uncovered string catalog numbers to sequences from the known corpus.

Rangitoki Barkcloth Fragment (RBF)



Photograph reprinted with the permission of the anonymous owner, courtesy of Robert Schoch and Tomás Melka. 2019. *The Rangitoki Bark-Cloth Piece*. *Asian and African Studies* (Bratislava) 28(2). 113-148 and 413-417 (Figures 1-7), p. 113.



50 - 95hj - 600 - 46 - 76 - 700 - 76v - 27V - 200 - [39_{Top}:107]

Provenance and Production

- Ten (10) glyphs, painted on a 15.5 cm by 4.5 cm strip of traditional *tapa* (bark-cloth)⁶⁶ using indigenous reddish mineral pigment.⁶⁷
- Gifted to Albert van Houten (AVH), a sailor who visited Easter Island in March 1869. He won the affections of a local young woman, Rangitoki, who gave him a souvenir: a small glyph-painted bark-cloth strip from her skirt. AVH retained the bark-cloth (coiled up and secured by twine) inside a pocket watchcase along with two tiny skull ornament beads (carved from bone) plus a short note of explanation in his native German language, roughly translated: “*A piece from the skirt of my beloved precious Rangitoki. Given to me as a present – March 1869*”.⁶⁸
- In 2018, Robert M. Schoch assisted in the sale of the antique pocket watch⁶⁹ and noted:

*. . . the dealer who was involved with negotiations between the descendants of AVH and the new (anonymous) owner at one point implied that the watchcase might be more desirable, and thus more valuable, than its actual contents (that is, the German note, two bone beads, and the bark-cloth [RR] fragment).*⁷⁰

Vernacular

- Conforms to classical corpus. Four of its 9 different glyphs (ʼ76, ʼ200, ʼ600, ʼ700) are listed among the top 20 most common signs to be found in the full RR corpus. ʼ76 is the second most frequently used glyphs in all RR inscriptions. There are two unusual forms: Claw-shaped version of ʼ27 and “leaf-topped” version of the bullseye form ʼ107.

Verse Structure

- There are two couplets, each concluding with the ʼ76 “penis”-like glyph.
- If these two couplets present successive stanzas, then the entire sequence appears to be a short, Limerick-like composition of no fewer than 4 lines.

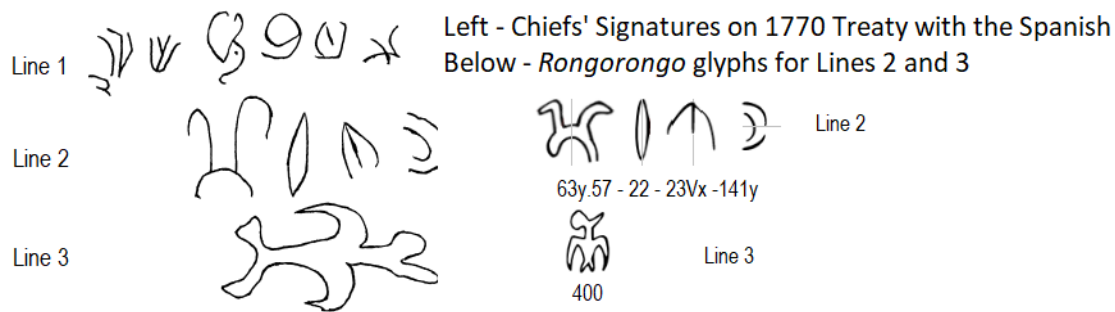
Calligraphy

- The inscription is legible but glyph drawing technique is - prima facie –*Verfallszeit* (declining period). The poor detail of handwriting may be excused, given the limitations of the bark-cloth medium and the inscription method (reddish pigment applied with brush). These would have been ill-suited to any thru-tracing of a perfected copy, already scribed on banana leaf media.
- The final [ʼ39_{Top}:107] compound is effaced on account of a tear in the bark cloth.

Conclusion

The verse structure, evident even in this short inscription, leads one to posit that Rangitoki and her scribe invested a bit of time in its composition, perhaps generating drafts on disposable banana-leaf media before copying the finished verses onto the bark-cloth. This is a delightful specimen in all respects, and I judge it to be an authentic product of the RR tradition.

Chiefs' Spanish Treaty Document of 1770 (CST)



Treaty signature sketches from Harrison, James. 1874. Note on Easter Island Writing. The Journal of the Anthropological Institute of Great Britain and Ireland. 3. 527-529, p. 528. (Open Access).

Provenance & Production

-The treaty between the Spanish and the Rapanui was signed when the Spanish took possession of the island. The ceremony was a “religious-military act in the Poike area to the NE of the island”.⁷¹ Three crosses were raised on hilltops to commemorate the event. Spanish officers and three Rapanui chiefs signed the document. Per commander Felipe González “...with which this act was completed, signing the possession of the corresponding individuals and three Indians of whom there were about 300”.⁷² The Rapanui signatures are glyphic or imagined characters.

- Peruvian José Toribio Gonzalez de La Rosa first showed a copy of the treaty glyphs to “the Anthropological Institute in London on 9 December 1873”.⁷³ Although the original version of the chiefs’ signatures has never been found, the RR epigraphic community widely regards these signature reproductions as being reliable representations.

-The treaty document would have been created using both ink and paper of European manufacture and each chief appears to have signed along a different line of glyphs.

-The first line of signs exhibits no relationship to RR. The third line presents only one character - a birdman (✓400) – perhaps the symbol for a chief.⁷⁴ The enigmatic second line contains four characters: all of them plausible RR signs. Further discussion of the chief signature document shall focus upon the second line of the treaty inscription.

Historic Analogues (New Zealand Treaty of *Waitangi*; Mayan syllabary writing shown to Spanish Friar Diego de Landa)

-Approximately 120 chiefs - not literate in English – signed the well-preserved *Raukawa Moana* (Cook Strait) page⁷⁵ of NZ's 1840 Treaty of Waitangi, using either indigenous symbols or ad hoc scrawls. Only one signature of the 120 bears even coincidental resemblance to RR. Therefore, the one-off probability of correctly printing a row of four RR signs by simple chance, (without knowing the writing) would seem small.

-Spanish Friar Diego de Landa (circa. 1566) transcribed Mayan characters written by his informants⁷⁶. Vis-à-vis the remaining Mayan inscriptions upon monuments, manuscripts, or pottery, de Landa’s copy is noticeably simplified. The ‘ma’ and ‘ne’ symbols are expressed as stick figures.



-Writing ad hoc, with unfamiliar stylus, upon foreign media, Rapanui chiefs might be excused for using simplified forms or stick figures (in like manner to de Landa’s informants) when signing the treaty. In a 2005 analysis of the CST, Horley⁷⁷ likewise regards the line 2 lead glyph as a stick figure and redraws it into a fuller sign form.

Vernacular

-None of the five RR characters on the Spanish treaty document are among the top 20 most common in the accepted corpus. However, its theme (a treaty) may well be quite different from the exploits, which inspired production of the classical pieces. There is one unusual compound glyph (✓63y:57), but the base glyphs from which it was derived are easily recognized.

Calligraphy

-Glyphs are drawn without artistic panache but well enough to be deciphered/traceable. The compound ʔ63y:57 is a stick figure.

-All second line glyphs offer an axis of symmetry.

Conclusion

Many epigraphers do not recognize the Line 2 signs of the CST as rongorongo. Notably, Fischer⁷⁸ uses the credibly dated (1770), but now lost, CST to support his theory that RR did not exist when the Spanish first visited Rapa Nui. On the other hand, the unusual circumstances of production of the CST ought to justify much of its abnormal vernacular and calligraphy. Ultimately, this document presents five consecutive, legitimate RR characters (entire last two rows). All Line 2 signs exhibit axes of symmetry: atypical for consecutive scrawls. That said, the meaning of these characters remains enigmatic, possibly related to the event at hand, the proper names of the chiefs, or other. This passage may ultimately be of corroborative utility in affirming RR character values determined through epigraphy of the lengthier inscriptions.

Conclusions

Authenticating RR Objects – Report Card							
Object	Zipf's Law	Provenance and Production	Vernacular	Verse Structure	Calligraphy	Special Features	Decision
SDT	●	●	●	●	●	●	😊
WAT	●	●	●	●	●	●	😞
MFI	●	●	●	●	●	●	😐
HPS	N/A	●	●	●	●	●	😞
RBF	N/A	●	●	●	●/●	N/A	😊
CST	N/A	●	●	N/A	●	●	😊
● = positive, ● = questionable, ● = negative							

😊 The SDT, RBF and CST receive positive ratings in most metrics of authenticity. These, therefore, appear to be genuine RR inscriptions and further investigation is warranted.

😞 The provenances of the WAT and HPS cannot be linked to authentic RR authorship by the Rapanui. Moreover, certain special features of these two artefacts are unsettling. On the WAT there is a notable lack of internal verse pattern plus an imprint of a modern reinforced strap. The HPS is mostly three copies of an inscription from the Small Santiago board.

😐 The MFI seems to encode an intelligent communication. However, it is a *ta'u rongorongo* object. Its glyphs may or may not have the same meanings as similar forms upon earlier RR artefacts. One should use caution when drawing on material from this board for development of RR epigraphy.

-In this study, provenance/production and verse structure were the most reliable means for determining whether an item is genuine. These metrics of appraisal should, therefore, be recognized for their critical importance in future assessments of artefact authenticity.

-The seemingly authentic SDT and MFI do not conform well to Zipf's law. For shorter inscriptions (45 to 100 glyphs length) the rigorous verse structure of RR produces a bulge in their log-log Zipf plot, here notable in the region of the 7th and 8th most frequently occurring glyphs. By contrast, the apparently spurious (WAT) displays quite impressive log-log rank frequency linearity. In the limited context of the artefacts studied here, a yellow dot ● (questionable conformity) for Zipf's Law potentially indicates an authentic RR inscription, whereas a green dot ● (good conformity) is more likely to occur with a counterfeit. Zipf⁷⁹ rationalized his law (indeed it is the title of his treatise) as the natural result of expending least effort to produce a successful result. Money-driven forgers would surely strive to output minimum effort in crafting convincing deceptions and perhaps that accounts for the good Zipf's law conformity displayed by the WAT.

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