RESEARCH NOTE 17

A Logogram for YAH "Wound"

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Among the many logographic signs which so far have escaped decipherment is a head sign which shows a V-shaped stepped design in its interior[1].


Figure 1. The Logograph 1078 in its manifestations 1078vc, 1078va and 1078vs. Drawings by Christian Prager.

The sign (Fig. 1) has been identified by Eric Thompson (1962) as T1078, and by Martha Macri and Mathew Looper (2003) as PE3. A closer look at the sign shows that its full form includes a small attached prefix with "darkness" markings (Fig. 2a-c). The example on a shell from Piedras Negras Burial 13 (Houston et al. 1998: Fig. 3) (Fig. 2c) shows that the prefixed sign has a small hook and that it most likely represents an obsidian tool, perhaps a knife, such as the personified obsidian eccentric knife on Piedras Negras Stela 8 (Fig. 2f). This affix has not received previous attention in any of the existing sign catalogues, although it does occurs independently in other contexts, such as within the stela names on the back sides of Copan Stelae F and M (Fig. 2d, e). The fact that the sign appears with exactly the same affixation when it has the "knife" sign attached to it and without it indicates

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[1]   This research note appears a few days after a post on the blog „Maya Decipherment" by Dimitri Beliaev and Stephen D. Houston (2020), which comes to similar results to those published here. This coincidence shows that epigraphy is a „mature discipline" in which researchers independently come to the same results, even though the details of interpretation differ.

that this is a complex logogram[2]. In the revised sign catalogue of our dictionary project we list the sign without the knife as 1078vc[3], with the knife above as 1078va, and with the knife to the left as 1078vs.
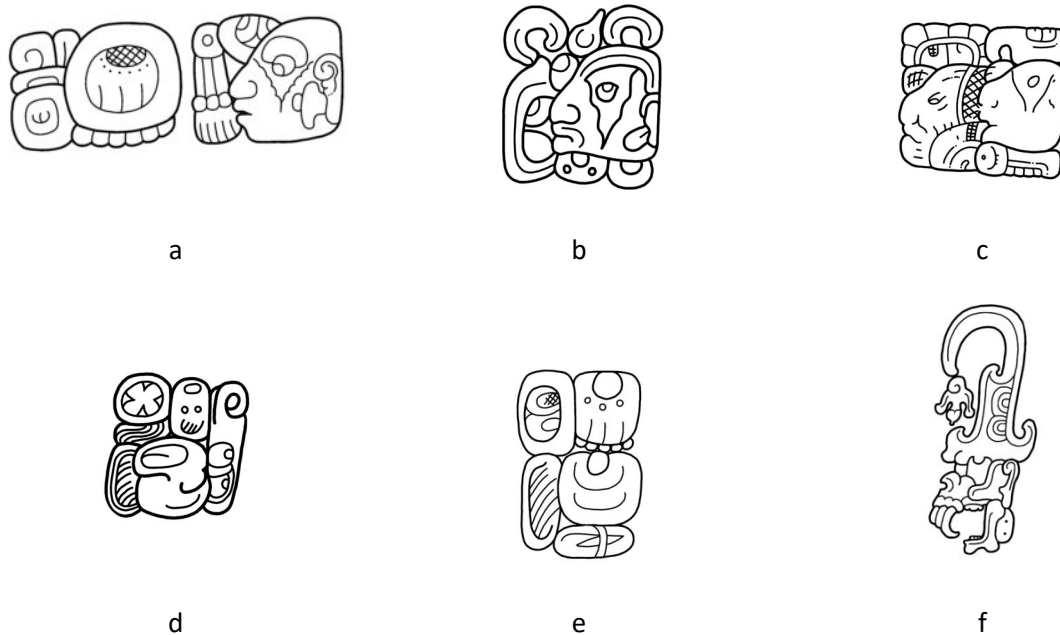
Figure 2. The T1078 logogram and the obsidian knife sign. a) Yaxchilan, Lintel 37, B3-A4 (after Graham 1979: 38); b) Copan, Stela J, back; c) incised glyphs on shell from Piedras Negras, Burial 13 (after Houston et al. 1998: Fig. 3); d) Copan, Stela F, B4; e) Copan, Stela M, A5; f) Piedras Negras, Stela 8.

The wound in the head and the knife attached to it suggest that the semantic field of the sign is somehow related to "wound" or "cut". In fact, the stepped wound looks exactly like the crack in the turtle shell of the famous plate Kerr 1892. Another example for a similar stepped V-sign representing a crack in a building is on the Codex style vessel Kerr 2068, which shows a dancing and axe-wielding Chahk in front of a house whose roof he has apparently just split (Figs. 3a and b).

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[2]   The sign has already been recognized as a compound sign by Alexandre Tokovinine (2013 and 2017).

[3]   As part of our work on a new catalogue of Maya signs and their graphs, we are currently evaluating and revising Thompson's Catalog of Maya Hieroglyphs (1962). We are critically scrutinizing his system with the help of his original grey cards and supplementing it with signs that were not included in Thompson's original catalogue. Despite its known shortcomings and incompleteness, his catalogue is still regarded as the standard work for Maya epigraphers, which is why we adopt Thompson's nomenclature while removing misclassifications and duplicates, merging graph variants under a common nomenclature, and adding new signs or allographs to the sign index in sequence, starting with the number 1500. Allographs are also further organized with the help of newly defined classification and systematization criteria, which we described in detail in Prager and Gronemeyer (2018). Basically, many graphs of Maya writing can be divided into two or more segments along their horizontal and vertical axes. These segmentation principles are designated by a two-letter code that is suffixed to the sign number. Revision of existing catalogues and their expansion, including a systematic index of all known allographs of each sign, will form the basis for our machine-readable text corpus of Classic Mayan.

Figure 3. The "split" or "wound" icon in Maya art. a) Kerr 1892 (photo by Justin Kerr); b) Kerr 2068. Photo courtesy of Justin Kerr, www.mayavase.com.

Figure 4. ya-YAH-ka-ba, yah kab "earth wound" on Pearlman 58 (after Coe 1982: 105). See also Kerr 1211 (www.mayavase.com).

If we turn to the written texts in which the wounded head appears, the initial assumption that it could indeed be a logogram for „opening" or "wound" becomes highly plausible (see also Beliaev and Houston 2020). From a syntactic point of view, it is clearly a noun. On the codex style vase Pearlman 58 (Coe 1982: 105) the sign appears as the last hieroglyph in the text below the rim of the vessel with the prefixed syllable **ya** and before the word *ka-ba*, probably for *kab* „earth" (Fig. 4). So this last hieroglyph might describe a toponym „wounded earth" or "earth wound". The preceding hieroglyphs spell the well-known dedication formula. Five hieroglyphs of the rim text are severely eroded. It is very likely that the last glyph of the rim inscription is part of the owner's nominal phrase, and that in this case, the toponym refers to a "wounded" or "split earth" place.

Figure 5. The YAH logogram on Dos Pilas Hieroglyphic Stairway I, Step III, D3 (Houston 1993: Fig. 4-16).

The logogram appears twice in similar contexts in the inscriptions of Dos Pilas. On Step 3 of Hieroglyphic Stairway 1 the verb *u ch'am* "he takes it" and the wounded head glyph appear after the date 4 Hix 12 K'ayab (9.14.11.4.15), just one day before a dance event of Itzamnaaj K'awiil taking place on 5 Men 13 K'ayab (Fig. 5). The description of both events on Hieroglyphic Stairway 1 is framing a scene with a multifigure composition. The scene shows nine figures in two groups facing a pair of tied balls. Seven figures wear long capes, two of them are dressed as ballplayers. The ballgame theme is more explicit on Steps 1 and 2, where we see large balls bouncing down stairways (Houston 1993: 112). In this context, the most likely explanation is to see the wounded head indeed as a logogram for **YA** or **YAH**, "wound", and to interpret the entire event as "he takes a wound", most likely a reference to the dangerous injuries caused by the heavy ball hurled towards the costumed figures.


Figure 6. The YAH logogram on Step V from Dos Pilas Hieroglyphic Stairway 2, central section. Drawing by the author.

The other Dos Pilas context is less clear. On Step V from the Central Section of Hieroglyphic Stairway 2, the "wound" logogram again appears after a hand sign, which could be a logogram for **YAL**, although some of the elements attached, such as the dotted line above the curl and the suffix are not easy to explain, unless the heavily eroded sign under the hand could be a verbal suffix (Fig. 6). The two following glyphs, **ba-te pi-tzi**, probably *baah te pitz*, "first lance (?) ballplayer" also establish a link with the ballgame theme. The date of this event probably is 4 Muluk 2 Mak (9.10.10.16.9), although the preceding distance number does not connect. In any case, this event probably can be interpreted as a ballgame related ritual taking place during the reign of Dos Pilas' king Bahlaj Chan K'awiil.
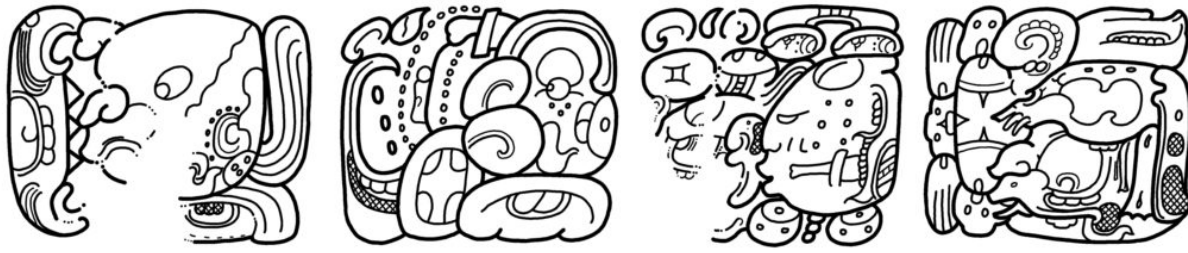
Figure 7. Hieroglyphs incised on a ballgame yoke from the vicinity of Bolonkin, Chiapas (drawing after Helmke, Yaeger and Eli 2018: Fig. 5).

The relationship to the ball game is also evident on an unprovenanced yoke which was allegedly found in the vicinity of Bolonkin, Chiapas, and was decorated with a set of beautifully incised shell inlays (Sheseña and Lee Whiting 2004) (Fig. 7). The extant inlays contain a name tagging phrase, which begins with the glyph composed of a **TUUN** logogram with the **YA/YAH** wound glyph infixed into it: **u-YA-TUUN-ni-a**, *u yatuun*, "his wound-stone". The following glyphs provide the name of the owner, an *ajk'uhu'n* "worshipper" or "priest" (Zender 2004) and *yajaw te' pitzil* "lord of the tree/lancet/spears, ballplayer" (cf. Tokovinine 2019:78) of the Tonina Ruler K'inich Baknal Chahk (Martin and Grube 2000: 181-182). It is clear from the context on the yoke that the possessed noun at the beginning of the phrase somehow must refer to a stone associated with the ballgame. There are two alternatives of interpreting this term „wound stone". It is possible that the ball court was interpreted as a wound in the surface of the earth. Another, perhaps more likely possibility is to connect this expression directly with the stone yoke. We still do not know exactly how these yokes where used in the ball game. The purposes of the stone yoke are controversially discussed; the main focus of this disagreement is whether or not the actual stone yoke was worn during a match, or whether it was an imitation of an object carved of wood or fabricated of wicker and leather. The text on the Bolonkin yoke suggests that some form of yoke was associated with wounds and pain, a very obvious association given the dramatic injuries that could accompany the game with a solid rubber ball.
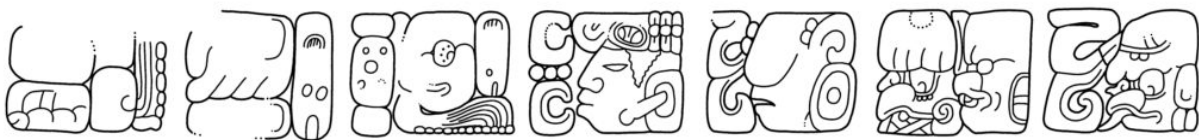
Figure 8a. Dedicatory statement on Copan Hieroglyphic Stairway Step 38 (drawing after Stuart 2005: Fig. 10.3)
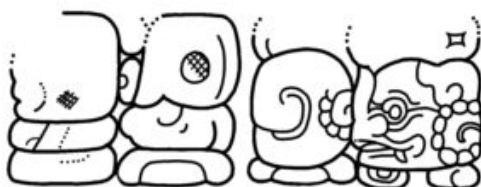

Figure 8b. Dedicatory statement on Copan Hieroglyphic Stairway Step 1 (drawing after Stuart 2005: Fig. 10.3)

Another important context for the glyph for the **YAH** glyph is on the Hieroglyphic Stairway from Structure 10L-26 at Copan (Stuart 2005: 383). The later of the two dedication events, which

commemorate the two construction phases of the stairway is written on Step 38 and refers to the date 8 Ajaw 13 Sek 9.16.4.1.0 (755 CE) (Fig. 8a) (cf. Houston et al. 2014/2015:20). The verb is **pa-ta-wa-ni**, *patwaan* "it is shaped/built", followed by three possessed nouns in sequence. The first of these are **ye-bu-li u-TUN-ni-li**, *y-ebil u-tuun-il*, "it is the stair, it is the stone of"[4]. The last possessed noun in this sequence is the **YAH** "wound" logogram with a prefixed **ya** syllable. The entire glyph probably describes Temple 26 as the "wound" or "cut" of K'ahk' Ti' Witz', Copan's Ruler 12. This phrase parallels the dedication expression on Step 1 (Fig. 8b), which reads *patwan y-ehbil u-muk-il* Copan –*ajaw*, the only difference between the two dedications being the replacement of the *u-mukil* expression by the **YAH** logogram.
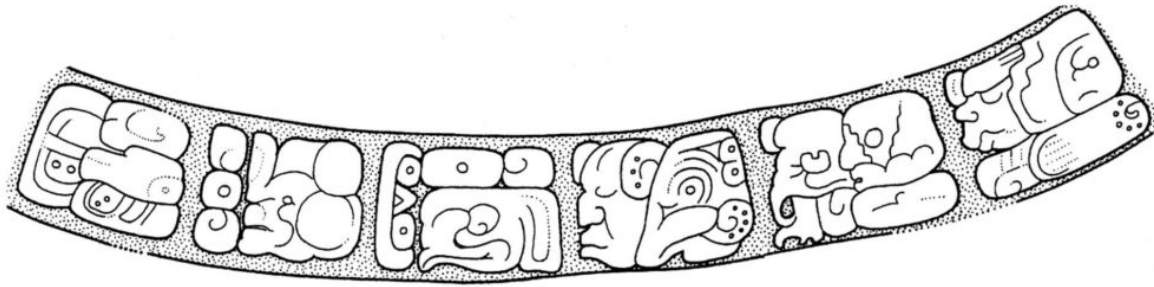
Figure 9. Glyphs 3-8 of a drum altar in the collections of the Fundación La Ruta Maya, Guatemala. Drawing by the author.

A similar context probably is seen on a drum altar from the Yaxchilan Region kept in the Ruta Maya foundation in Guatemala (Fig. 9). The circular text also contains a dedication phrase which begins with a date 7 Muluk 17 Yaxk'in 9.16.13.5.9 (764 CE). The next three glyphs describe the dedication of the object as **i-KAL-ja**, *i-k'a[h]l-aj* "and then it is dedicated/presented", followed by the *y-uxul* "carving" expression and another, possessed noun **u-we-be-na-li**. Marc Zender, Dmitri Beliaev and Albert Davletshin interpret this expression as a reduced form of **uweibaanaal* or *uwebnaal* "one's thing for tamale-eating" (Zender et al. 2016: 45). There can be no doubt that this possessed noun is a reference to the drum altar itself. The altar is understood as a place "…where tamale plates or similar comestible offerings were offered" (Zender et al. 2016: 45). Glyph 8 shows the outline of a stepped structure with a skull in its interior. This is the logogram **MUKNAL**, "burial place", with a prefixed **u** sign (in form of a fish variant) and another small sign, perhaps a prefixed **mu** complementing the following logogram. Before the burial glyph, in Glyph 7, we see our wound glyph, again with a prefixed **ya** syllable. Altogether, I read the noun sequence in this dedication phrase as "the tamale-eating-thing of the wound of the burial". Names and titles of the buried individual follow (Grube and Luin 2014).

In the burial context, I see the "wound" glyph as a metaphorical expression for the tomb being a wound in the body of the building. If buildings were considered as animate objects, anything left inside or stuck into the body of it could be regarded as a wound. In particular, a burial set into the already existing floor of a building, whereby the floor had to be chopped up and "injured" again, could probably be seen as fundamental to a conception of the burial as a "wound".

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4   Inside the u sign before the word tuunil there might be an infixed bi syllable. This could indicate that the passage is talking about a bi-tuun, a "road-stone" or "stone road". The whole sequence could then be translated as „the stone-road of pain".

In regard to the linguistic reading of the glyph, the fact that it occurs several times with a **ya**-prefix and that in all these contexts a syntactic function as a possessed noun is possible, could suggest a noun with the initial vowel /a/, whose ergative pronoun has the form *y*- expected. However, the presence of a pronoun *u* on the ball game yoke from Bolonkin argues against this assumption. The common **ya** prefix hints at the first two phonemes of the reading. In at least three cases, the sign also has the vowel sign **a** as a suffix. Semantically and morphologically, the reading **YAH** "wound" is the best solution for this sign. In some dictionaries, the root is simply given as *ya*, without any consonant in the final position. The explanation for this is that the root was *yah* with a final glottal spirant, which in many dictionaries was not represented orthographically (Ola Orie and Bricker 2000:304) or replaced by a glottal stop. This could account for the occasional addition of an **a** sign in the script. As a **CV**h-logogram, the sign has a similar syllable structure as the logograms **BAAH** "image", **NAAH** "house", and **K'UH** "god". Because **BAAH** and **NAAH** have long vowels, they more often stand with phonetic complements (in both cases **hi**). **K'UH** resembles more closely the proposed **YAH** logogram, in that it has a short vowel. For that reason, **K'UH** hardly ever is followed by a phonetic complement. I suspect that this also explains the absence of final phonetic complements for the **YAH** sign.

Yah has a variety of meanings related to "wound" in lowland languages. In Yucatecan languages, the lexical field also includes "love". In many other Mayan languages, the root has the related meanings of "hot, sharp" and "picante" and "sickness":

Proto-Ch'ol:
yah   aj que duele // painful (Kaufman and Norman 1984: 137)
yaj   aj/s sick; sickness; sore, wound (Kaufman and Norman 1984: 137)
Chontal:
yaj   s enfermedad, dolor (Keller and Luciano G. 1997: 292)
yajc'äb s herida en la mano (Keller and Luciano G. 1997: 292)
ya'oc s herida en el pie, llaga de los pies (Keller and Luciano G. 294)
Ch'ol:
yaj   tumor, papera (Aulie and Aulie 1978: 141)
Tzeltal:
ya   llaga (Ara 1986: 303)
Yucatec:
ya   cosa dañina, mal, daño, dolor, doler; llaga pequeña no peligrosa o herida ya con podre (Barrera Vásquez 1980: 959)
yahil llaga (Barrera Vásquez 1980: 959)
yail   dolor o llaga (Barrera Vásquez 1980: 959)
Itza:
*yajil* n3a injury, wound, saddle sore, pain, sore, infection, difficulty (Hofling and Tesucun 1997: 691)
Mopan:
yaj   n1 pain (Hofling 2011: 471)
yajil n3 wound, injury, pain Hofling 2011: 472)

The **YAH** sign also occurs in a number of contexts which are still problematic, especially where they appear in names of supernaturals or toponyms (Fig. 10). In the single case on a codex style ceramic, the sign appears in as part of the nominal of a death god who is called **SAK-ja-la YAH**, "white-becoming wound (Fig. 10a). In Copan and Tikal, *yahal* "place of the wound/place of pain" appears within sequences of supernatural toponyms (Figs. 10b, c). A phantastic creature combining a skeletal

hood, manatee teeth and water lily on top of its head is called **a-YAH**, probably *aj yah*, "he of the wound, he of the pain" in the Bonampak murals (Fig. 10d).

| a | b | c | d |
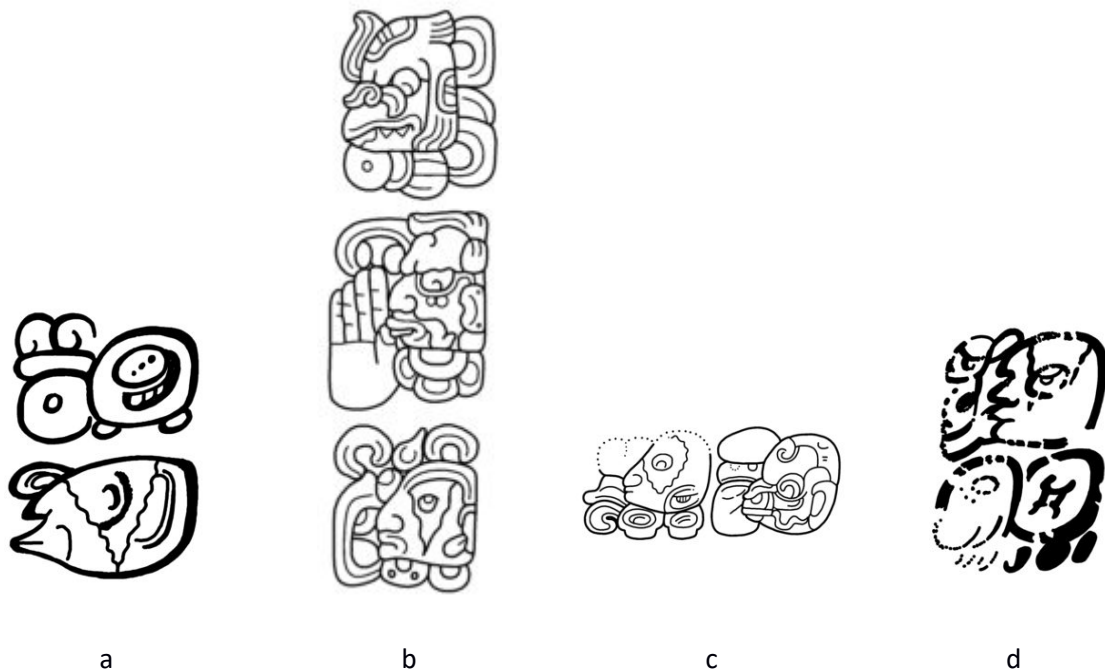
Figure 10. Examples for the YAH logogram in the context of supernatural names and toponyms. a) SAK-ja-la YAH "white-becoming wound", Kerr 2213; b) ya-YAH-la "place of the wounds/place of the pain", Copan Stela J, back side; c) ya-YAH-la "place of the wound/place of the pain", Tikal Stela 10, G8-H8; d) a-YAH, "he of the wound/he of the pain", Bonampak Structure 1, Room 1, north wall, Caption I-36 (after Miller and Brittenham 2013: 79). Drawings by the author.

| a | b |
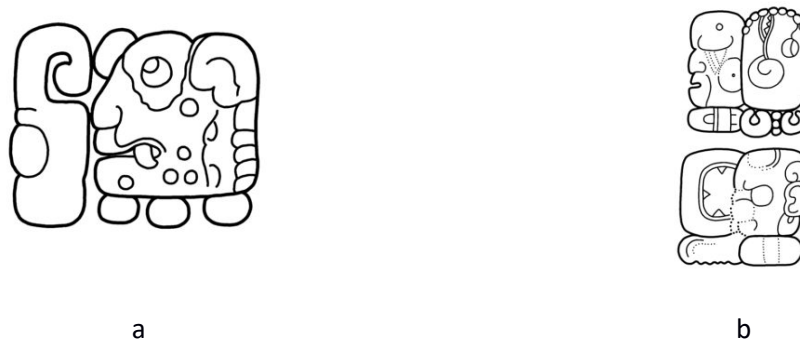
Figure 11. YAH in name phrases of historical individuals. a) YAH-BALAM-ma, yah balam "wounded jaguar/pain jaguar" on Ixtutz Panel 2, Block 4, S1–T1 (after a photo by Bruce Love); b) YA-ki? hu-ya K'IHN-ni CHAHK-ki, Ucanal Stela 4, D1-2 (after Graham 1980: 159).

Further examples of the YAH logogram appear in nominal phrases of historic kings. **YAH BALAM-ma**, "wounded jaguar" or "pain jaguar" is the name of a lord from Ixtutz (Fig. 11a). On Ucanal Stela 4 we may see a name written **YA-ki? hu-ya K'IHN-ni CHAHK-ki** (Fig. 11b).

The iconographic origin of the **YAH** logogram probably lies in an obsidian knife that was used for sacrificial purposes. The logogram shows a head with deep cuts. However, it can stand for all forms

of pain associated with wounds made with sacrificial tools. An impressive example of this is the scene on the ceramic Kerr 3844, where we see a group of seven anthropomorphic and zoomorphic beings identified as *wayoob* due to the accompanying hieroglyphic captions. All figures hold staffs with large obsidian knives or eccentric obsidian blades in their hands. The six anthropomorphic figures have a penis tied with knotted cords, similar to the depictions of the hero twins engaged in auto-sacrifice in the wall paintings of San Bartolo. Two groups move towards a central temple, which contains a mummy bundle and an incense offering. I will not go into the details of this fascinating scene. In connection with the **YAH** reading it is important that the two figures close to the temple are identified with the split head glyph. The left figure is called **YAH K'EK'EN xa-MAN-na wa-WAY**, *yah k'ek'en xaman way* „Pain-Pekkari north way". The figure to the right of the temple has a name that begins with **YAH** and consists of a second, as yet undeciphered element. In connection with the sacrificial theme underlying the entire scene, it is easy to understand that two participants recorded pain as a central element of their name phrase.


Figure 12. a) Two way figures in a sacrificial scene identified with the YAH attribute on Kerr 3844. Photo courtesy of Justin Kerr, www.mayavase.com.

b   c

Figure 12. b) YAH K'EK'EN xa-MAN-na wa-WAY, caption to the figure to the left of the temple, c) caption to the figure to the right of the temple. Drawing by the author.

Perhaps the stepped elements that appear on the stone thrones on Caracol Altar 23 (Fig. 13) should also be understood in the context of the iconography of **YAH**. The two bound figures from Bital and Ucanal are high-ranking prisoners who were most likely ritually killed. The marking of the stones on which they sit could express that they are **Yah**-stones, "wound altars" on which they were executed with an obsidian knife.
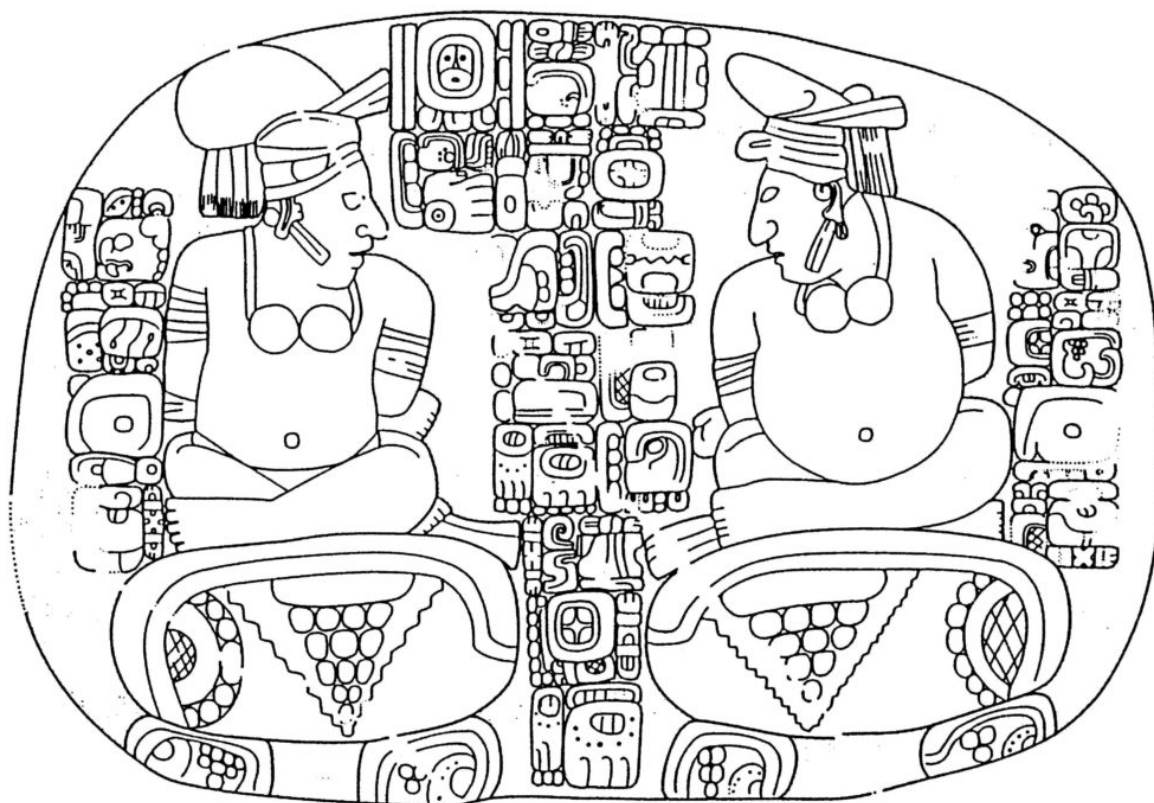
Figure 13. Caracol, Altar 23. Drawing by the author.

Finally, I would like to discuss another suggestion by Christian Prager. A long time ago, Eric Thompson proposed the reading **YAH** for the affix T172, which occurs exclusively in the codices (Thompson 1967). For this reading there is no phonetic substitution so far, it is based exclusively on the analysis of the contexts in which the sign occurs. The sign appears mostly as a prefix before nouns and must therefore denote an attribute or an adjective. Linda Schele and I continued to use Thompson's **YAH** reading for the sign in our analyses of the Dresden Codex, because it can be interpreted very well in contexts where it seems to refer to the outcome of negative actions (Schele and Grube 1997). As such a negative attribute, T172 is used in the Venus Table to describe the result of the hurling of the Atlatl spears of the Venus gods, as well as the effect of solar and lunar eclipses (Fig. 14). The reading **YAH** for T172 also fits very well in many other sections of the codices. Based on the orregular outline and the hook in its lower part, T172 could well be the codex variant of the obsidian knife, which in classic writing is part of the complex sign T1078va and T1078vs.

Figure 14. T172 as the codex variant of the YAH logogram. a) T172 (drawing by Christian Prager); b) Dresden 57a (Sächsische Landes- u. Universitätsbibliothek, Dresden); c) Dresden 46b (photo courtesy of Sächsische Landes- u. Universitätsbibliothek, Dresden)

Acknowledgements

References

Ara, Domingo de

1986 [1571] Vocabulario de lengua Tzeldal segun el orden de Copanabastla. Edición de Mario Humberto Ruz. Fuentes para el Estudio de la Cultura Maya, 4. Centro de Estudios Mayas, Universidad Nacional Autónoma de México, México, D.F.

Aulie, H. Wilbur, and Evelyn W. Aulie

1978 Diccionario ch'ol-español, español-ch'ol. Serie de Vocabularios y Diccionarios Indígenas, Mariano Silva y Aceves no. 21. Instituto Lingüístico de Verano, México, D.F.

Barrera Vásquez, Alfredo (ed.)

1980 Diccionario Maya-Cordemex, maya-español, español-maya. Ediciones Cordemex, Mérida.

Beliaev, Dmitri, and Stephen D. Houston

2020 A Sacrificial Sign in Maya Writing. Maya Decipherment. https://mayadecipherment.com/2020/06/20/a-sacrificial-sign-in-maya-writing/, accessed June 22, 2020.

Graham, Ian

1979 Corpus of Maya Hieroglyphic Inscriptions, Volume 3, Part 2: Yaxchilan. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Mass.

1980 Corpus of Maya Hieroglyphic Inscriptions, Volume 2, Part 3: Ixkun, Ucanal, Ixtutz, Naranjo. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Mass.

Grube, Nikolai, and Camilo Alejandro Luin

2014 A Drum Altar from the Vicinity of Yaxchilan. Mexicon XXXVI (2): 40-48.

Helmke, Christophe, Jason Yaeger and Mark Eli

2018 A Figurative Hacha from Buenavista del Cayo, Belize. The PARI Journal 18(3): 7-26.

Hofling, Charles Andrew

2011 Mopan Maya-Spanish-English Dictionary. The University of Utah Press, Salt Lake City.

Hofling, Charles Andrew, and Félix Fernando Tesucún

1997 Itzaj Maya-Spanish-English Dictionary. The University of Utah Press, Salt Lake City.

Houston, Stephen D.

1993 Hieroglyphs and History at Dos Pilas. Dynastic Politics of the Classic Maya. University of Texas Press, Austin.

Houston, Stephen D., Héctor Escobedo, Donald Forsyth, Perry Hardin, David Webster and Lori Wright

1998 On the River of Ruins: Explorations at Piedras Negras, Guatemala, 1997. Mexicon XX (1): 16-22.

Houston, Stephen D., Barbara W. Fash, and David S. Stuart

2014 Masterful Hands: Morelli and the Maya on the Hieroglyphic Stairway, Copan, Honduras. RES: Anthropology and Aesthetics(65/66):15–36.

Hull, Kerry

2016 A Dictionary of Ch'orti' Mayan-Spanish-English. The University of Utah Press, Salt Lake City.

Kaufman, Terrence S., and William M. Norman

1984 An Outline of Proto-Cholan Phonology, Morphology, and Vocabulary. In Phoneticism in Mayan Hieroglyphic Writing, edited by John J. Justeson and Lyle Campbell, pp. 77-166. Institute for Mesoamrican studies Publicaton no. 9. State University of New York, Albany.

Keller, Kathryn, and Plácido Luciano G.

1997 Diccionario chontal de Tabasco (mayense). Serie de Vocabularios y Diccionarios Indígenas "Mariano Silve y Aceves" no. 36. Summer Institute of Linguistics, Tucson.

Laughlin, Robert M.

1988 The Great Tzotzil Dictionary of Santo Domingo Zinacantán. Smithsonian Contributions to Anthropology no. 31. Smithsonian Institution Press, Washington, D.C.

Macri, Martha J., and Matthew G. Looper

2003 The New Catalog of Maya Hieroglyphs, Volume 1: The Classic Period inscriptions. University of Oklahoma Press, Norman.

Martin, Simon and Nikolai Grube

2000 Chronicle of the Maya Kings and Queens. Thames & Hudson, London and New York.

Miller, Mary and Claudia Brittenham

2013 The Spectacle of the Late Maya Court. Reflections on the Murals of Bonampak. University of Texas Press, Austin.

Ola Orie, Olanike, and Victoria E. Bricker

2000 Placeless and Historical Laryngeals in Yucatec Maya. International Journal of American Linguistics 66(3): 283-317.

Prager, Christian, and Sven Gronemeyer

2018 Neue Ergebnisse in der Erforschung der Graphemik und Graphetik des Klassischen Maya. In: Ägyptologische "Binsen"-Weisheiten III: Formen und Funktionen von Zeichenliste und Paläographie [Akademie der Wissenschaften und der Literatur, Abhandlungen der Geistes- und sozialwissenschaftlichen Klasse, 15], edited by Svenja A. Gülden, Kyra V. J. van der Moezel and Ursula Verhoeven-van Elsbergen, pp. 135–181. Franz Steiner Verlag, Stuttgart.

Schele, Linda, and Nikolai Grube

1997 Notebook for the XXIst Maya Hieroglyphic Forum at Texas, March 1997: The Dresden Codex. Department of Art and Art History, the College of Fine Arts, and the Institute of Latin American studies, University of Texas at Austin.

Sheseña, Alejandro, and Thomas A. Lee Whiting

2004 Yugo incrustado con glifos mayas procedente de alrededor de Chilón, Chiapas. Mexicon XXVI (6): 127-132.

Stuart, David

2005 A Foreign Past. The Writing and Representation of History on a Royal Ancestral Shrine at Copan.In: Copan, the History of an Ancient Maya Kingdom, edited by E. Wyllys Andrews and William L. Fash, pp. 373-394. School of American Research Press, Santa Fe.

Thompson, John Eric S.

1962 A Catalog of Maya Hieroglyphs. University of Oklahoma Press, Norman.

1967 Preliminary Decipherment of Maya Glyphs 4. Cranbrook Institute of Science, Bloomfield Hills.

Tokovinine, Alexandre

2013 Beginner's Visual Catalog of Maya Hieroglyphs. Unpublished manuscript, Corpus of Maya Hieroglyphic Inscriptions, Peabody Museum, Harvard University.

2017 Beginner's Visual Catalog of Maya Hieroglyphs. Mesoweb, San Francisco, CA. http://www.mesoweb.com/resources/catalog/Tokovinine_Catalog.pdf

2019 Fire in the Land: Landscapes of War in Classic Maya Narratives. In Seeking Conflict in Mesoamerica: Operational, Cognitive, and Experiential Approaches, edited by Shawn G. Morton and Meaghan M. Peuramaki-Brown, pp. 77–100. University Press of Colorado, Boulder, CO.

Zender, Marc

2004 A Study of Classic Maya Priesthood. Ph.D. dissertation, University of Calgary. Zender, Marc, Dmitri Beliaev, and Albert Davletshin

2016 The syllabic sign we and an apologia for delayed decipherment. The PARI Journal 17(2): 35-56.