## Title:  Encoding proposal for two arrow symbols used in Egyptology

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**Status:** Expert Contribution
**Distribution:** UTC, WG2
**Replace:** N/A

## Executive Summary:

This document presents an encoding proposal for two additional arrows for use in the context of Egyptian Hieroglyphs to indicate reading direction. The unusual feature is that the horizontal arrow direction conveys the direction of the faces, not the reading direction. As such they are opposite of the usual convention used for other languages in the context of Right To Left (RTL) or Left to Right (LTR) directions.

## Proposal

The proposal is to add new information concerning the use of 3 existing arrows in the core specification in the section concerning Egyptian Hieroglyphs and encode two new arrows.

In Egyptology, U+2190 ← is used to indicate a writing in rows, hieroglyphs facing left (reading direction LTR), U+2192 → is used to also indicate writing in rows, but with hieroglyphs facing right (reading direction RTL). Note that the convention concerning reading direction is opposite from the one used for most other scripts. In addition, U+2193 2193 is used to indicate a writing in columns, but with hieroglyphs facing unknown (reading direction could be RTL or LTR).

Alternatively, or in addition, the following text could be added in the code chart but may be not advisable, given that arrows have many purposes, and it may be peculiar to document a behavior very specific to Egyptian hieroglyphs in that location.

<u>Annotation to existing characters.</u>

2190 ← LEFTWARDS ARROW
     • used in Egyptology to indicate writing in rows, hieroglyphs facing left (reading direction LTR), opposite from convention used for other scripts

2192 → RIGHTWARDS ARROW
     • used in Egyptology to indicate writing in rows, hieroglyphs facing right (reading direction RTL)

2193 ↓ DOWNWARDS ARROW
     • used in Egyptology to indicate writing in columns, hieroglyphs facing unknown (reading direction could be RTL or LTR)

In addition to documentation concerning these 3 existing characters, two new characters should be added to cover the two other cases concerning writing in columns with known hieroglyphs facing direction:

New characters in the block: Supplemental Arrows-C U+1F800..U+1F8FF:

1F8C0 ⇤ LEFTWARDS ARROW FROM DOWNWARDS ARROW
   • used in Egyptology to indicate writing in columns, hieroglyphs facing left (reading direction LTR)

1F8C1 ⇥ RIGHTWARDS ARROW FROM DOWNWARDS ARROW
   • used in Egyptology to indicate writing in columns, hieroglyphs facing right (reading direction RTL)

It could also be argued whether the annotation above should be added to the code chart, or in similar fashion to the existing 3 arrows, only documented in the core specification covering Egyptian Hieroglyphs.

Properties for the new arrows are the same as for other generic arrows:

UnicodeData.txt
1F8C0; LEFTWARDS ARROW FROM DOWNWARDS ARROW;So;0;ON;;;;;N;;;;;
1F8C1; RIGHTWARDS ARROW FROM DOWNWARDS ARROW;So;0;ON;;;;;N;;;;;

EastAsianWidth.txt
New entry:
1F8C0..1F8C1 ;N  # So [2] LEFTWARDS ARROW FROM DOWNWARDS ARROW.. RIGHTWARDS ARROW FROM DOWNWARDS ARROW

NamesList.txt
As appropriate once finalized.

Scripts.txt
New entry:
1F8C0..1F8C1 ;Common  # So [2] LEFTWARDS ARROW FROM DOWNWARDS ARROW.. RIGHTWARDS ARROW FROM DOWNWARDS ARROW

VerticalOrientation.txt
The new signs share the same 'R' value as existing arrows.

It should be noted that alternatively to the symbols proposed for U+1F8C0 and U+1F8C1, other symbols such as ⇤ and ⇥ can be found to denote the same concept but they are less common, and because the arrows are encoded with descriptive names, it is important to encode the common shapes.

# Background information

Due to the diversity in which Egyptian Hieroglyphs can be presented in term of horizontal or vertical layout and left to right or left to right row progression, it is common to provide symbols to determine the 'reading direction'. The general principle is that the face of the asymmetric signs such as human or animal signs is pointing to the start of the sentences.

hieroglyphs facing **left** = reading **LTR**; hieroglyphs facing **right** => reading **RTL**

Note however, see below, that this usage of the term "reading direction" refers to specifically *"quadrat-internal"* reading sequence, not to quadrat alignment sequence (= the "primary reading direction"), although they are typically identical.

Five symbols can be used to facilitate the determination of the reading direction:
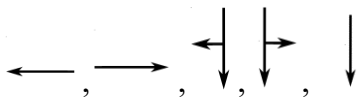


There are <span style="color:red">**four parameters**</span> (two of which are not independent from each other):

1.  <span style="color:purple">**Line or column writing**</span>:
    (*primary* information), the <span style="color:purple">**horizontal vs. vertical angle**</span> of the *longer* **stroke** (horizontal arrow not relevant*)

    

    (writing from bottom to top is -- if existing -- extremely rare and exceptional.). In the examples above, the two cases where the horizontal arrows are rightwards, the actual sign are facing rightwards.
2.  Hieroglyphs <span style="color:blue">**facing direction**</span> in the original:
    (*secondary* information), direction of the <span style="color:blue">***horizontal* arrow**</span>:

    

3
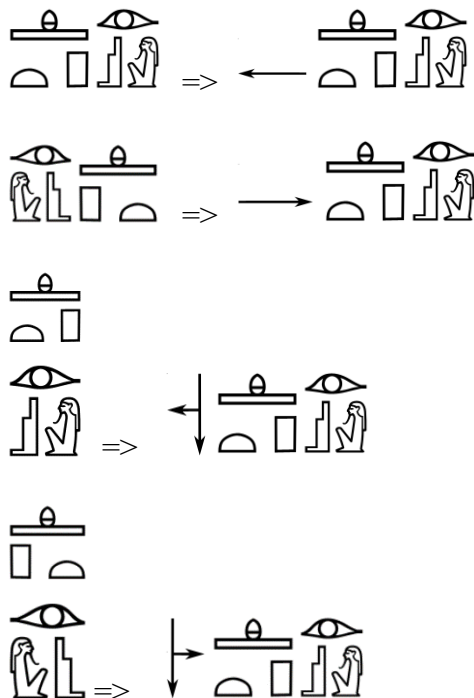
If one cannot know the facing direction since the column *only has symmetric signs* (rare):
***no horizontal arrow***
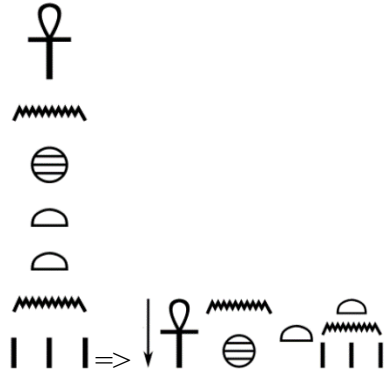
3.  **Quadrat/column-internal reading direction**
    Note that the **quadrat/column-internal reading direction** is always **opposite to** the **facing of the hieroglyphs** ( ⌢ before ▢, 𓀎 before 𓀎 in the examples above; exceptions are rare, and should be considered as mistakes).
    Consequently, the facing direction also indirectly *indicates* the quadrat/column-internal reading direction (which is opposite).
    i.   signs facing left => quadrat/column-internal LTR
    ii.  signs facing right => quadrat/column-internal RTL
4.  **Progression of columns** (relevant in column writing only, since lines in line writing are *always* arranged top to bottom):
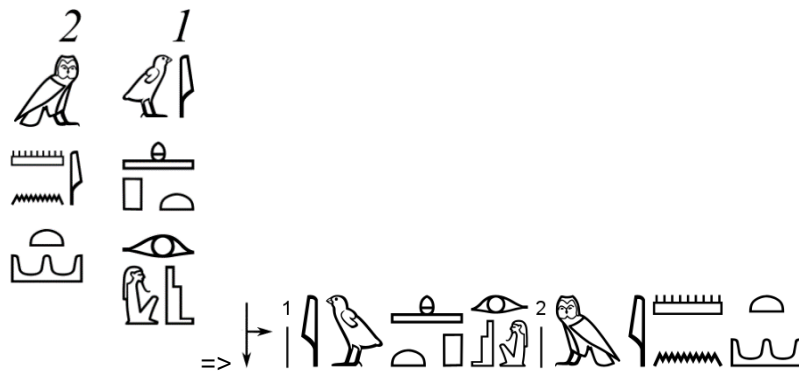    **although not formally represented by the horizontal arrows**, the default is to assume that it follows the reading direction of the signs:
    a.   normal (default):
         facing direction of sings ***opposite to*** reading direction/sequence of columns

(column; signs facing left = quadrat/column-internal LTR; default column sequence: LTR)

(column; signs facing left = quadrat/column-internal RTL; default column sequence: RTL)

b. "**retrograde**" (exceptional, notably often in netherworld literature):
facing direction of sings *in line with* reading direction/sequence of columns



(column; signs facing left = quadrat/column-internal LTR; retrograde = column sequence RTL)



(column; signs facing right = quadrat/column-internal RTL; retrograde = column sequence LTR)

Consequently the arrows have the following implications:

⟵ : line writing (<= long line horizontal), **hieroglyphs facing** left (<=arrow pointing left)
=> quadrat sequence LTR ("primary reading direction")
=> quadrat-internal LTR ("secondary reading direction")

⟶ : line writing (<= long line horizontal), **hieroglyphs facing** right (<=arrow pointing right)
=> quadrat sequence RTL ("primary reading direction")
=> quadrat-internal RTL ("secondary reading direction")

↲ : *column writing (<= long line vertical),* **hieroglyphs facing** *left (<=small arrow pointing left)*
=> *quadrat sequence TTB ("primary reading direction")*
=> *quadrat/column-internal LTR  ("secondary reading direction")*
(Column alignment can be normal [LTR] or retrograde [RTL])

↳ : *column writing (<= long line vertical), hieroglyphs facing right (<=small arrow pointing right)*
=> quadrat sequence TTB ("primary reading direction")
=> quadrat/column-internal RTL  ("secondary reading direction")
(Column alignment can be normal [LTR] or retrograde [RTL])

↓ : column writing (<= long line vertical), hieroglyphs facing not discernible  (<=no small arrow)
=> quadrat sequence TTB ("primary reading direction")
=> quadrat/column-internal : not applicable
(Column alignment can be normal [LTR] or retrograde [RTL])

It is possible to find examples where the convention expressed above concerning asymmetric sign orientation and reading direction is not followed but it is rare and is not endorsed by this document. See for example the following example where the arrows indicate the reading direction (RTL or RTL), not the face direction: Source: https://www.researchgate.net/publication/354349768_A_Deep_Learning_Approach_to_Ancient_Egyptian_Hieroglyphs_Classification

**FIGURE 1.** Examples of hieroglyphic signs and their reading direction.

To some degree, because of the confusion between reading direction and face orientation it is important to create a well-established convention and getting one version settled in the Unicode Standard can achieve that goal.

# Evidence

Figure 2 and 3, Kitchen, Ramesside Inscriptions I, p. xxx and xxxi

Abbreviations

II. Textual

cj.r(s).        — conjectural(ly) restoration(s)/restored.

corr.           — correction.

sic             — unexpected, but present in the original or copy used.

so              — milder than sic; regular reading, but not always ob-
                  viously such.

( ⟶ )           — original text is written horizontally, with signs
                  facing right; text to be read from right to left.

( ⟵ )           — original text is written horizontally, with signs
                  facing left; text to be read from left to right.

( ⤓⟶ )          — original text is written vertically, with signs
                  facing right; here, set horizontally as (--- ).

( ⟵⤓ )          — original text is written vertically, with signs
                  facing left; here, set horizontally as ( ---).

[    ]          — encloses signs now lost, but recorded in earlier
                  copies.

[////]          — encloses text (or text-space) lost; hatched signs
                  are cj. r.

⟨ ⟩             — encloses signs erroneously omitted by the original.

{ }             — encloses superfluous signs in the original.

( )             — encloses signs reported (in publications, etc.) but
                  not actually given, or not available  to the editor.

∬               — separates distinct sections of unrelated text here
                  written on same line in this work.

//              — parallel (text).

PREFACE

The purpose of this work is simple: to make available the principal
texts of the Ramesside age (c.1300-1070 BC) in a compact and accurate
edition that should be comprehensive but handy to use. For kings other
than ephemeral, a consistent but flexible order of material has been
adopted: foreign affairs (esp. dated), then internal affairs (dated doc-
uments, special topics or groups), then geographical series north to
south, then minor remains, other documents (e.g., papyri), and royal
family. Monuments of contemporaries are ranged in 28 basic categories
which are standard throughout these volumes. Citation of this work
should be as KRI, by volume, page and line.

Text-presentation was given much prior thought. Whenever possible,
horizontally-written texts are given in their original grouping and
orientation. The same applies to vertical texts, except that their col-
umns are transposed to the horizontal plane. Texts are given as in the
originals, i.e. generally continuous, not with modern sentence-division.
These procedures stem from severely practical considerations. First, a
reversed text is doubly hard to collate accurately. Second, sentence-
division is subjective in some classes of text, and mis-division can be
misleading (e.g., JEA 59,226f., on Urk.IV,1287,20f.). Third, such divis-
ion often entails much waste space - the 2000 or 3000 pages of this work
could soon become 9000 with no gain. Fourth, scholars and students alike
should accustom themselves to reading texts in their real form, and to
making their own analysis of linguistic/literary structure, not as dic-
tated by an editor. On restorations, restraint is deliberate, as major
restorations are frequently conjectural and by their presence can close
the mind to alternatives; they belong better in translations with comm-
entaries. Factual corrigenda are welcome, and will be incorporated in
volumes II-VII as appropriate.

This project has been underway for some 20 years since its modest
beginnings, and my indebtedness to others and gratitude for help afforded
are wide-ranging, and a pleasure to acknowledge. Through award of the
T.E. Peet Travelling Prize in 1962/63 and support from the Joint Commit-
tee on Research then and later, the University of Liverpool made possible
a vast amount of fieldwork in Egypt. In 1970, an award from the Sir
Ernest Cassell Trust facilitated a specially valuable season in Luxor.

Figure 4: Fischer, The orientation of hieroglyphs, part I, reversals, p. xxiii

ABBREVIATIONS AND SYMBOLS                    *xxiii*

| | |
|---|---|
| *Wb. Belegst.* | A. Erman and H. Grapow, editors, *Wörterbuch der ägyptischen Sprache: Die Belegstellen*, 5 vols. Leipzig-Berlin 1935–1953. |
| **Weill**, *Décrets* | R. Weill, *Les Décrets royaux de l'Ancien Empire égyptien*. Paris 1912. |
| **Wolf**, *Die Kunst Ägyptens* | W. Wolf, *Die Kunst Ägyptens: Gestalt und Geschichte*. Stuttgart 1957. |
| *WZKM* | *Wiener Zeitschrift für die Kunde des Morgenlandes*. Vienna. |

*     before texts and translations, indicates a hypothetical reading

[  ]    in texts and translations, indicates a restoration

⟨  ⟩    indicates an emendation

→     indicates that hieroglyphs or figures face right

←     indicates that hieroglyphs or figures face left

. . .    omission

——    in translations, indicates that one or more words are untranslated

........   beneath hieroglyphs, emphasizes that their orientation conforms to that of the original text

Figure 5 : Catalogue de la fonte hiéroglyphique de l'IFAO, p. 490 "signes conventionnels".



XXX. — SIGNES CONVENTIONNELS.

| | | | |
|---|---|---|---|
| 1 | ▨ | 3778 | 1,2,3 |
| 2 | ▨ | 3779 | 1,2,3 |
| 3 | ▨ | 3780 | 1 |
| 4 | ▨ | 3781 | 1 |
| 5 | ▨ | 3782 | 1 |
| 6 | ▌ | 1024 b | 1 |
| 7 | ▌ | 1017 b | 1,2 |
| 8 | ▌ | 170 b | 1,2 |
| 9 | ▬ | 1150 b | 1 |
| 10 | ▬ | 1149 b | 1,2 |
| 11 | ▪ | 1152 b | 2 |
| 12 | ⊣ | 215 b | 2 |
| 13 | ⊢ | 216 b | 2 |

Other references: Lingua Aegyptia. Journal of Egyptian Language Studies 28 (2020), p. 129 (Benoît Lurson intitulé "Une scène de débardage engageante ?), not accessible online.

App implementation: JSesh https://jsesh.qenherkhopeshef.org/

# Acknowledgements

**PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS**
**FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646**[1]
**Please fill all the sections A, B and C below.**
**Please read Principles and Procedures Document (P & P) from** http://std.dkuug.dk/JTC1/SC2/WG2/docs/principles.html **for guidelines and details before filling this form.**
**Please ensure you are using the latest Form from** http://std.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html**.**
**See also** https://www.unicode.org/roadmaps/ **for latest** *Roadmaps*.

**A. Administrative**

1. **Title:** _____
2. Requester's name: _____ *Michel Suignard* _____
3. Requester type (Member body/Liaison/Individual contribution): _____ *Individual* _____
4. Submission date: _____ *7/11/2023* _____
5. Requester's reference (if applicable): _____
6. Choose one of the following:
    This is a complete proposal: _____ *Yes* _____
    (or) More information will be provided later: _____

**B. Technical – General**

1. Choose one of the following:
    a. This proposal is for a new script (set of characters): _____ *No* _____
        Proposed name of script: _____
    b. The proposal is for addition of character(s) to an existing block: _____ *Yes* _____
        Name of the existing block: _____ *Supplemental Arrows-C* _____
2. Number of characters in proposal: _____ *2* _____
3. Proposed category (select one from below - see section 2.2 of P&P document):

| | | |
|---|---|---|
| A-Contemporary ____ | B.1-Specialized (small collection) ____ | B.2-Specialized (large collection) ____ |
| C-Major extinct ____ | D-Attested extinct ____ | E-Minor extinct ____ |
| F-Archaic Hieroglyphic or Ideographic **X** | | G-Obscure or questionable usage symbols ____ |

4. Is a repertoire including character names provided? _____
    a. If YES, are the names in accordance with the "character naming guidelines"
        in Annex L of P&P document? _____ *X* _____
    b. Are the character shapes attached in a legible form suitable for review? _____ *X* _____
5. Fonts related:
    a. Who will provide the appropriate computerized font to the Project Editor of 10646 for publishing the standard?
        *Michel Suignard*
    b. Identify the party granting a license for use of the font by the editors (include address, e-mail, ftp-site, etc.):
6. References:
    a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided? _____ *Yes* _____
    b. Are published examples of use (such as samples from newspapers, magazines, or other sources)
    of proposed characters attached? _____ *Yes* _____
7. Special encoding issues:
    Does the proposal address other aspects of character data processing (if applicable) such as input,
    presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)? _____ *Yes* _____

8. Additional Information:

Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at http://www.unicode.org for such information on other scripts. Also see Unicode Character Database ( http://www.unicode.org/reports/tr44/ ) and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

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[1] Form number: N4502-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10, 2007-03, 2008-05, 2009-11, 2011-03, 2012-01)

**C. Technical - Justification**

1. Has this proposal for addition of character(s) been submitted before? — *No*
    If YES explain _____
2. Has contact been made to members of the user community (for example: National Body,
    user groups of the script or characters, other experts, etc.)? — *Yes*
        If YES, with whom? — *Group of Egyptologist*
        If YES, available relevant documents: — *List provided in the proposal*
3. Information on the user community for the proposed characters (for example:
    size, demographics, information technology use, or publishing use) is included? — *Historic*
    Reference: _____
4. The context of use for the proposed characters (type of use; common or rare)
    Reference: _____
5. Are the proposed characters in current use by the user community? — Yes
    If YES, where?  Reference: — *Egyptologists*
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely
    in the BMP? — *No*
        If YES, is a rationale provided? _____
        If YES, reference: _____
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)? — *Yes*
8. Can any of the proposed characters be considered a presentation form of an existing
    character or character sequence? — *No*
        If YES, is a rationale for its inclusion provided? _____
        If YES, reference: _____
9. Can any of the proposed characters be encoded using a composed character sequence of either
    existing characters or other proposed characters? — *No*
        If YES, is a rationale for its inclusion provided? _____
        If YES, reference: _____
10. Can any of the proposed character(s) be considered to be similar (in appearance or function)
    to, or could be confused with, an existing character? — *No*
        If YES, is a rationale for its inclusion provided? _____
        If YES, reference: _____
11. Does the proposal include use of combining characters and/or use of composite sequences? — *No*
    If YES, is a rationale for such use provided? _____
        If YES, reference: _____
    Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided? _____
        If YES, reference: _____
12. Does the proposal contain characters with any special properties such as
    control function or similar semantics? — *No*
        If YES, describe in detail (include attachment if necessary)
_____
_____
_____
13. Does the proposal contain any Ideographic compatibility characters? — *No*
    If YES, are the equivalent corresponding unified ideographic characters identified? _____
        If YES, reference: _____