Hieroglyphic writing in ancient Egypt and its cognitive involvement

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1.

The hieroglyphic writing was used during three millenia and half, in the Nile Valley, the first manifestations dating around 3250 B. C., the last one during the first half of the fifth Century A. C. So, not only has it been co-extensive with the Pharaonic State (from 3000 to 331 B.C.), but also it has survived its disappearance due to the Alexander's conquest, since it was still used during the Ptolemaic Period and the Roman Period. Its death is directly connected with the promotion of Christian religion as state religion and the consequent prohibition of paganism believes. Indeed, hieroglyphic writing being tightly bound with traditional Egyptian religion, the proscription of the former elicited the vanishing of the latter.

The hieroglyphic writing implements some remarkable cognitive processes that can be highlighted through the description of its main hallmarks.

For a clear description of the hieroglyphic writing we should carefully distinguish the way it is materialized (§§2-2.2.3) from the system it involves (§§3-3.3.1).

2. Materiality of the hieroglyphic writing

The hieroglyphic writing has a basic property: the «figurativity». This is not so much common in the world written cultures (Mayas; Harapeans; Hittite hieroglyphs; Phaistos disk and some other mediterranean scripts until now undeciphered), even though it may have been present at the origin, and then lost; such is the case of Chinese script.

«Figurativity» should be distinguished from «iconicity» which has a by far more wide meaning. Hieroglyphs signs are figurative because they represent elements of the pharaonic world according to the same principles that work for full-fledged pictures.

For instance, let us look at this inscription:

FIGURE 1

One needs not to be a brilliant Egypologist to recognize, even roughly:

: a lady wearing a diadem.

: a human face.

⌐: a human foot with base of the leg.

◯: an human mouth.

🐘: an elephant.

: a ram.

: a quail chick.

: a vulture on a basket.

, : a flowering reed.

: a rush with shoots.

⊔⊔: a hill-country.

△: a hill-slope.

〰〰〰: rippling water.

2.1

The close relationship between hieroglyph sign and picture is clearly illustrated by scenes showing how the same reality may be represented **both** as a **picture** and as a **writing sign**.

For instance, the following scene depicts craftsmen making stone vessels.

FIGURE 2

Among the different stone vessels, a jug with handle is represented first above, in a row of ready made vessels, while under in the main representation, another jug with handle is being bored with a drill by the craftsman at right.

Above this craftsman, there is a column of hieroglyphic inscription, meaning «This jug is very good.».

Among the hieroglyphs used in this inscription, one should notice the sign 🏺, which is now shown painted in red for sake of clarity:
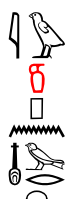
It represents the same jug with handle that we have seen to be depicted twice. So, in this scene, the same object is both:

- • represented as a full-fledged element of a picture.
- • represented as a full-fledged element of writing.

2.2

Now, when it is clear that a hieroglyph is basically an image, it should differentiate from a mere image to function as a sign of writing in an inscription. This differentiation arises from three main specific constraints:

• Calibration (2.2.1).
• Investment of space (2.2.2.).
• Orientation (2.2.3).

2.2.1 Calibration

The respective dimensions of the hieroglyphic signs are not proportional to the respective dimensions of their «referents», that is to say the reality they represent. Looking back at the former inscription (FIGURE 1), we can observe that the hieroglyph representing a quail chick ⟨image⟩ fills the same space as the hieroglyph representing an elephant ⟨image⟩ !

Without this kind of calibration, too much space would have been wasted, due to the great difference of size of the realities depicted as hieroglyphic signs.

2.2.2 Space investment

In our writings, the signs follow each other in a straight row. It works differently as regards the Egyptian hieroglyphs. There is a strong trend towards arranging them so as to make them fill the space devoted to the inscription with two main concerns:

• A concern to reduce the blank to what is necessary to distinguish one hierogyph from the other; this arises from a search for density.

• A concern to allow a regular lay out: this arises from a search for harmony.

The space of the inscription is divided in spatial invisible square or rectangular unities, for which the Egyptologists have coined the term «cadrat». According to its morphology, a sign may occupy a whole «cadrat»,

or some division of the cadrat, may be a vertical half, may be an horizontal half, may be a vertical third, may be an horizontal, may be a quarter; etc.

For instance, the geographical name for «Egypt» may be written ![owl glyph]. This graphy actually encompasses four signs: ◁, 🦉, △, ⊗. Far from being displayed in a straight row, they are arranged within a «cadrat», so as to leave the minimum blank space.

As a further illustration, compare an inscription in which the hieroglyphs are laid out so as to show density and harmony:

FIGURE 3

with what it would have looked if the hieroglyphs would have been simply arranged in a single line, each one following the other:

2.2.3 Orientation

A large number of hieroglyphic signs have an unsymmetrical morphology. That means that they have one prevailing orientation. This is particularly conspicuous for the signs that are pictures of animates. For instances, the prevailing orientation of the sign ![seated figure glyph] is marked by the direction he faces, in this case the left.

Asymmetrical sign cannot be displayed regardless of their prevailing orientation.

In an inscription, as a rule, they have **to look towards the beginning of the inscription**, that is to say the direction of reading goes backwards to them. So, drawing [sign] as such, that is to say looking leftwards, implies that the inscription starts on left side. Conversely, writing it [sign], that is to say looking rightwards, implies that the inscription starts on right side. This is true for all asymmetrical sign. Returning back to the inscriptions displayed on FIGURE 1, we can observe that the same sign, a flowering reed, appears in two different orientation, respectively [sign] and [sign]. The reason is that in the part of the inscriptions in which it shows the rightwards orientation [sign], the text reads from right to left. Conversely, in the part of the inscriptions in which it shows the leftwards orientation [sign], the text reads from left to right.

2.2.3.1

Hieroglyphic inscriptions may be laid out in horizontal lines or in vertical columns (always downwards).

The basic direction of reading is leftward, as shown by mundane and everyday «tachygraphies» on manuscripts, but on monuments and on objects, an inscription reading rightward is equally possible.

So, hieroglyphic inscriptions can be laid out in four main directions

a) rightwards in horizontal lines;
b) leftwards in horizontal lines;
c) downwards and rightwards in vertical columns:
d) downwards and leftwards in vertical columns.

The following figure illustrates how the same text can be laid out in the four directions. The simple arrows, ← or →, indicate the orientation of asymmetrical signs and the starting point of the inscription. The double arrows ⇒ or ⇐, and ⇓ indicate the directions of reading.
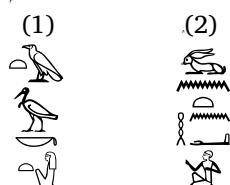
- A. Horizontal lines, starting left, reading rightwards (←⇒):

(1)

(2)

- B. Horizontal lines, starting right, reading leftwards (→⇐):

 (1)

 (2)

- C. Vertical columns, starting left, reading downwards and rightwards (←—⇒⇓):

(1)   (2)

- D. Vertical columns, starting right, reading downwards and leftwards (→⇐⇓):

(2)   (1)
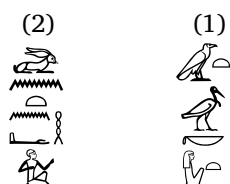
We should note that in certain restricted circumstances under certain semiotic necessities, the direction of reading may be forewards to the orientation of asymmetrical hiéroglyphs; this is called «retrograd orientation». An example is displayed below (§7.2, caption pertaining to the god Dedun).

3. The hieroglyphic system

For coding the language products, the hieroglyphic system uses both the ideographic strategy and the phonetic strategy. Thus, it involves signs that function as ideograms (§ 3.1), and signs that function as phonograms (§3.2). Moreover, to them, it adds signs that function as classifiers, the so-called «determinatives» (§3.3).

3.1 Ideograms

Certain hieroglyphs can function as ideograms, that is to say, they may be used to write a word, or a notion susceptible to be actualized in different words built on the same root, or even built on different roots with the same meaning. Since a hieroglyph is an image (§2), when it is used as an ideogram, a relationship obtains between what it represents and what it means.

3.1.1

This relationship may be direct. Examples:

- The hieroglyph representing an ear writes the Egyptian word for «ear», *msḏr* (read *mesdjer*).

- The hieroglyph representing a cat writes the Egyptian word for «cat», *mjw* (read *mejew*).

- The hieroglyph representing a lotus flower writes the Egyptian word for «lotus flower», *sšn* (read *seshen*).

- The hieroglyph representing an obelisk writes the Egyptian word for «obelisk», *ṯḫn* (read *tekhen*).

3.1.2

The relationship between what represents a hieroglyph and what it means when functioning as an ideogram may be less direct. It may be metonymic or metaphoric, it may rely on cultural specificity, it may involve an artificial combination of images.

- An ideogram can mean not the being or the object it depicts, but the action implied. , the sign showing a crocodile with curve tail functions as an ideogram to write the Egyptian word for «pull together», *s3ḳ* (red *s'aq*). But

the sign showing a crocodile with straight tail functions as an ideogram to write the Egyptian words meaning «crocodile», for instance *msḥ* (read *meseh*).

- The hieroglyph representing a scribe's outfit writes the Egyptian word for «write» *zš* (*zesh*).

- The hieroglyph representing a sail swollen with wind writes the Egyptian words for «wind», for instance *ṯ3w* (read *tch'aw*).

- The hieroglyph representing a ship with sail swollen with wind writes the Egyptian word for «sailing upstream, southward», *ḫnt* (read *khent*); in Egypt, the north wind is prevailing, while the Nile flows northward.

Some ideogram may involve a higher degree of artificiality in combining two or more images:

- The hieroglyph representing a cow suckling a calf writes the Egyptian word «show solicitude», *3ms* (read *'ames*).
- The hieroglyph representing a man with a pouring water vessel above him writes the Egyptian word for «be pure», *wˁb* (read *w'ab*).
- A variant is still more artificial : it represents a pouring water vessel combined with a foot , here functioning as phonogram for *b* (see § 3.2.1), the last consonant of *wˁb* (*w'ab*).
- A particular case of ideography is the duplication of an ideogram to express the dual, and the triplication of an ideogram to express the plural. For instance: «god», *nṯr* (read *netcher*); «the two gods», *nṯr.wy* (read *netcherwey*); «the gods», *nṯr.w* (read *netcherew*).

3.2 Phonograms

Contrary to a common but superficial idea, the hieroglyphic system is phonetic in a rather large proportion. Hence, a lot of hieroglyphs function as phonograms. They convey a sound or a set of sounds, and not a meaning. There is no more relationship between what they mean and what they represent. Their phonetic values are based on the principle of *rebus*. For instance, the hieroglyph represents a tongue. Besides its ideographic use for writing the Egyptian word for «tongue», *ns* (read *nes*), it may be used also, not to mean «tongue», but merely to convey the two consonants involved in the Egyptian word for «tongue», that is to say *n* and *s*.

In a way partly illustrated in Hebrew and in Arabic scripts, the Egyptian system writes only the consonant, leaving to the reader the charge of figuring out the vowels thanks to his knowledge of Egyptian language. This is made possible by the very structure of Egyptian lexicon, notions being

conveyed by abstract consonantal roots (one, two, three, sometimes four consonants), while the vocalization helps to discriminate the different words through which a root can be actualized.

3.2.1

The phonograms may write one consonant or more, up to four consonants.

«Quadriliteral» phonograms combine four consonants; ex.: ∩∩∩ combines the cononants $m + ^\varsigma + b + \jmath$.

«Triliteral» phonograms combine three consonants; ex.: combines the cononants $s + n + \underline{d}$.

«Biliteral» phonograms combine two consonants; ex: combines the consonants $m + t$.

«Uniliteral» phonograms represent only one consonant; they are called more commonly «alphabetic» signs; ex. , dealt with above (§2.2.3), writes the consonant j or the consonant'. Each of the twenty four (or twenty five) consonants of the Egyptian phonetic system may be written by an alphabetic sign, except – in older times at least – the consonant l. They may be classified on a chart showing Egyptian alphabet.

3.3 Determinatives

A lot of hieroglyphs – roughly about one hundred and twenty at classical periods – can function as classifiers. The Egyptologists prefer to speak of «determinatives». When functioning as a determinative, a sign is put at the end of a word, after the ideogram, and/or the phonograms. Deprived of any phonetic value, it indicates the semantic class to which the word belongs. We show in the following a score of determinatives and the semantic classes they mark.

• The name of a god, or, more generally, a word pertaining to a divine notion or to a highly respectable notion can be determined by ⟨glyph⟩, or by ⟨glyph⟩. Examples:

⟨glyphs⟩ «Amon».

The hieroglyph ⟨glyph⟩ functions as a determinative indicating the belonging to the class of gods of the Egyptian name *jmn,* the consonantal structure of which, is written with the alphabetic sign ⟨glyph⟩ *j*, and with the biliteral phonogram ⟨glyph⟩ *mn*, with a redundant alphabetic sign *n* ⟨glyph⟩.

⟨glyphs⟩ «lord».

The hieroglyph ⟨glyph⟩ functions as a determinative indicating the belonging to the class of gods of the Egyptian word *nb,* the consonantal structure of which is written by a biliteral phonogram ⟨glyph⟩.

• A human name, a human category, and anything pertaining to *ego* can be determined by ⟨glyph⟩. Examples:

⟨glyphs⟩ «priest (pure one)».

The hieroglyph ⬚ functions as a determinative indicating the belonging to the class of human of the Egyptian word *wʿb,* which, is written by an ideogram (see §3.1.2).

⬚ «I (personal pronoun)».

The hieroglyph ⬚ functions as a determinative indicating the belonging to the class of *ego* of the Egyptian pronoun *jnk,* the consonantal structure of which is written by two phonograms, a biliteral phonogram ⬚ *jn,* and a redundant alphabetic sign ⬚ *k.*

• a word involving an action or a state of the mouth can be determined by ⬚. Example:

⬚ «starve».

The hieroglyph ⬚ functions as a determinative indicating the belonging to the class of state involving the mouth of the Egyptian word *ḥḳr* (read *heqer*), the consonantal structure of which is written by three alphabetic signs, ⬚ *ḥ,* ⬚ *ḳ,* and ⬚ *r.*

• a word involving an action of the legs or a motion can be determined by ⬚. Example:

[hieroglyph] «enter».

The hieroglyph [hieroglyph] functions as a determinative indicating the belonging to the class of motion of the Egyptian word ꜥq (read *'aq*), the consonantal structure of which is written by two phonograms, a biliteral phonogram [hieroglyph] ꜥq, and a redundant alphabetic sign [hieroglyph] q.

• a word involving the notion of small or the notion of evil can be determined by [hieroglyph] (sparrow, a small bird and an evil bird for the peasant's harvest). Example:

[hieroglyph] «evil».

The hieroglyph [hieroglyph] functions as a determinative indicating the belonging to the class of evil notion of the Egyptian word ḏw (read *djew*), the consonantal structure of which is written by two phonograms, a biliteral phonogram [hieroglyph] ḏw, and a redundant alphabetic sign [hieroglyph] w.

• A word designating a building can be determined by [hieroglyph]. Example:

[hieroglyph] «door».

The hieroglyph [hieroglyph] functions as a determinative indicating the belonging to the class of building of the Egyptian word sbꜣ (read *seb'a*), the
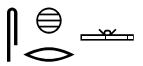
consonantal structure of which is written by a triliteral phonogram ✳ *sb3*, and three redundant alphabetic signs, ⎮ *s*, ⌟ *b*, and 🦅 *3*.

• a word involving the notion of tree or wood (as material) can be determined by ☞. Example:

☞ «a kind of tree».

The hieroglyph ☞ functions as a determinative indicating the belonging to the class of wood of the Egyptian word ˁ*wn.t* (read *'awenet*), the consonantal structure of which is written by an alphabetic sign ☞ ˁ, a biliteral phonogram 🐇 *wn*, with a redundant alphabetic sign 〰 *n*, and a last alphabetic sign ⌒ *t*, to write the feminine suffix.

• a word involving the notion of writing, or involving abstract notions can be determined by ✄. Example:

✄ «plan, decision».

The hieroglyph ✄ functions as a determinative indicating the belonging to the class of abstract notions of the Egyptian word *sḫr* (read *sekher*), the

consonantal structure of which is written by three alphabetic signs, ⎮ *s,*

⊖ *ẖ,* and ◁ *r.*

3.3.1

A word can receive more than one determinative to specify its semantic class. Example:

🦅🔘🧍 «embalmer».

The consonant structure of the word *wt* (read *wet*) is written by two alphabetic signs 🦅*w,* and ◠ *t.* It can have three determinatives, 🔘, indicating its belonging to the class of bodily morbid growths and state; ⬜ , indicating its belonging to the class of hand activity, and 🧍, indicating its belonging to the class of human category.

3.3.2

A determinative has a **demarcative effect**. It helps to distinguish the lexical units in a text in which there is no separation between words, and no punctuation.

A determinative has also a **discriminative effect**. It helps to distinguish between two homophone words. For instance, the Egyptian word 🐰〰️⌃ *wn,* «hurry» and 🐰〰️🦅 *wn,* «fault», show the same consonantal structure, written by the phonogram 🐰 *w* + *n,* with a redundant alphabetic sign 〰️ *n.* They are distinguished by the difference

of the determinatives, in one case ⌃ (motion), in the other 🕊 (notion of evil), see above (§ 3.3).

4. Functioning of the system

The respective uses of these three categories of signs – ideograms, phonograms, and determinatives – are based on principles and customs prone to vary according to the period and also according to the type of document (religious, mundane, manuscripts, monuments, etc.). Purely ideographic graphies (§ 4.1) coexist with purely phonetic graphies (§4.2) and with graphies combining ideograms and phonograms (§4.3).

4.1

Words that can be written with an ideogram are not so numerous as one might expect *a priori*. They belong to the basic lexicon: names of gods, parts of the body, usual objects and realities of the everyday life.
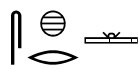
When an ideogram writes a name, it is often marked by a stroke. Examples:
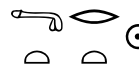
ḥr (read *her*), «face» or (with determinative) *ḥr* (read *hor*), «Horus». *ḫꜣs.t* (read *khaset*), «foreign country»; note that functions as a redundant alphabetic sign, writing the feminine suffix *t*.

4.2

A lot of words are written with phonograms, most often followed by determinative(s). Examples:

ḥḳr (read *heqer*), «starve» (see §3.3).

sḫr (read *sekher*), «plan, decision» (see §3.3).

ꜥwn.t (read *'awenet*), «a kind of tree» (see §3.3).

mtr.t (read *meter.t*), «midday»; biliteral phonogram

writing *m* + *t*, with a redundant alphabetic sign *t;* alphabetic sign *r;*

the second functions as a full alphabetic sign, writing the feminine

suffix *t;* determinative indicating the belonging of the word to the
notion of time.

Some phonograms can be redundant, making explicit a consonant already

written by another phonogram: *mḥwnw* (read *mehewnew*),

«slaughterer». , biliteral phonogram writing *mḥ*; biliteral
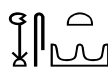
phonogram writing *w* + *n*, with a redundant alphabetic sign *n;*
biliteral phonogram writing *n* + *w*, the *n* being one more time redundant;

, determinative indicating the belonging of the word to the class of
actions of knife.

4.3

Mixed graphies, combining ideograms with redundant phonograms,
possibly followed by determinative(s). Examples:

- ⳤ *ḫ3s.t* (read *kh'aset*), «foreign country, desert»; the biliteral phonogram *ḫ3*, and the «alphabetic» signs *s*, and ⌒ *t*, make explicit the phonetic structure of the ideogram ⌣⌣. Compare with the purely ideographic graphy of the same word, quoted on § 4.1.

- *šnw.t*, «granary»: the biliteral phonogram *šn*, and the biliteral phonogram *nw* (writing the semi-consonant *w* while making explicit the second consonant *n* of *šn*) make explicit the phonetic structure of the ideogram.

4.4

The system opens a lot of possibilities for coding of the language data through the script. For instance, the name of the sun god Re, may be written:

- With an ideogram; as regards the god Re, a set of hieroglyphs can fulfil this function: ☉; ; ; ; .

- With an ideogram marked as such by a stroke: .

- With an ideogram followed by a determinative: ; .

- With an ideogram marked as such by a stroke and followed by a determinative: ; .

- With two phonograms writing its consonant structure, the alphabetic signs ⌒ *r*, and ‘, followed by a determinative: .

- With an ideogram of which the phonetic structure is made explicit by two alphabetic signs: .

- With an ideogram of which the phonetic structure is made explicit by two alphabetic signs, and followed by a determinative: .

It should be stressed that this inventory is far from being complete.

4.4.1

However, numerous as may be the possibilities, generally speaking, the graphies remained relatively constant on the whole, at least during the older age of the pharaonic civilisation. Admittedly, there was no fixed orthographic norm, such as the orthographic norms ruling European scripts. But overwhelming trends, uses, customs maintain a certain regularity at least within a period and within a category of document.

Now, it should be stressed that the door remained always open to choice a less common graphy, an uncommon graphy, sometimes even an original graphy when the scribe felt motivated to do so.

5. Exploiting the particular properties of hieroglyphic writing

Sketchy as it may be, this preceding description shows how complex was the hieroglyphic writing. How complex, and also how cumbersome to be implemented, how long and uneasy to be written out! Nevertheless, it has been used during three millennia and half. Thus, were the ancient Egyptians unable to simplify it? Certainly not. They had mastered methods of writing without ideograms (§5.1) and manner of diminishing the difficulty bound to the figurativity of hieroglyphs (§5.2).

5.1

We have seen that the hieroglyphic system was not only in great part phonetic, but also involved alphabetic signs, that is to say signs coding the language at the level of the mere phoneme. Thus, Egyptian language could have been written with twenty four or twenty five consonantal signs; in addition, semi-consonantal signs could have been used to indicate long vowels in the manner of *matres lectionis* of Semitic scripts. Moreover, there existed a special subsystem, commonly but not very accurately called «group writing», that was used to write either foreign words or purely Egyptian words felt as restricted to the vernacular and foreign to the written language. This subsystem combining signs and groups of signs conveying syllables either with fixed or with non fixed vocalism show that the ancient Egyptians were perfectly able of writing without ideograms, even though determinatives could be – not should be – implemented.

5.2

As regard the figurativity of the script, which is obviously an obstacle against fluent writing, they had created «tachygraphies» (from Greek words meaning «quick writing out»), that is to say, cursive ways of drawing not only each hieroglyph but also group of hieroglyphs; they are called «hieratic» and «demotic» scripts.

5.3

Thus, why ancient Egyptian did not simplify this very cumbersome and uneasy hieroglyphic writing while they had a full ability of doing so? The reason is that this difficulty is the reverse of extraordinary semiotic capacities that can be dealt with under three main headings:

Capacity of fitting to an object or a monument (§ 6).

Capacity of integrating to an adjacent representation (§7).

Capacity of coding language data while, in the same time, opening a specific space of expression (§8).

6. Capacity of fitting to an object or a monument

Hieroglyphic writing is basically a monumental writing, taking «monumental» as pertaining to a monument but also, more generally, to any object. Indeed, inscriptions, far from using a monument as a mere surface of display, can be written out so as to be in harmony with its specific structure. For instance, let us have a look to this entrance leading to an adjacent room in an Egyptian temple.

FIGURE 5

From architectonic point of view, a door is organized in two symmetrical parts, delimitated by a central vertical axis. Thanks to its properties as regard direction (§ 2.2.3.1), the hieroglyphic writing can be laid out so as to respect the architectonic hallmarks of the door.
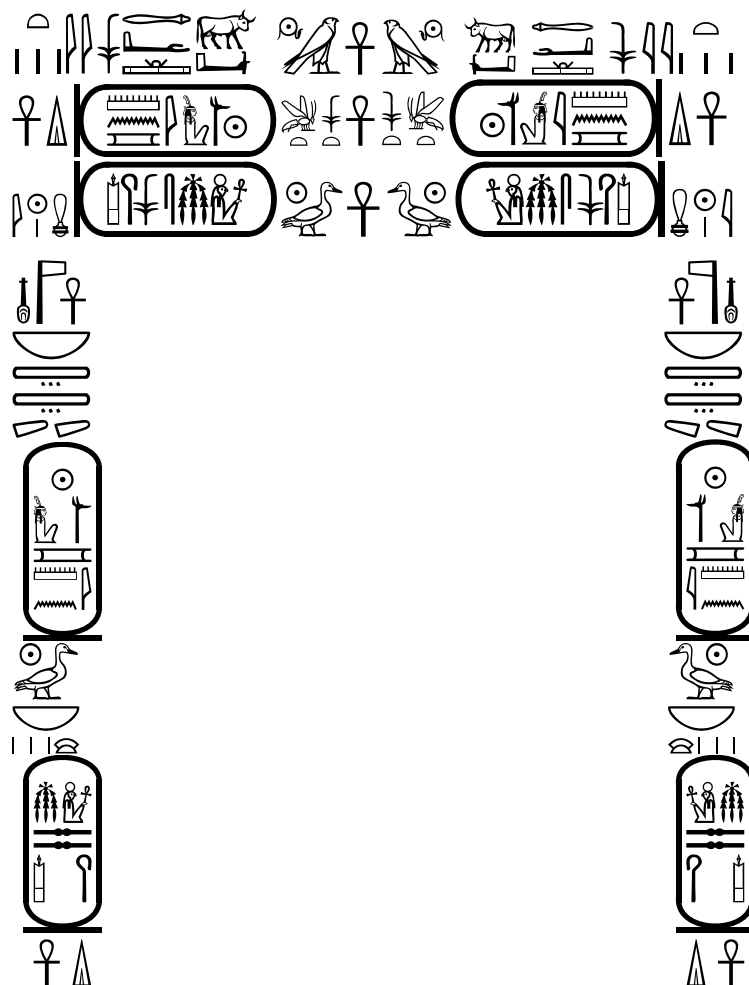
On each half of the lintel there are three lines of inscriptions that mirror each other.

On the left part, the three lines of inscriptions read from right to left, starting from three ☥ signs which materialize the middle axis. The asymmetrical hieroglyphs, for instance 𓅿, 𓃒, 𓆰, 𓆷, 𓅬, etc., are facing right.

On the right part, the three lines of inscriptions read from left to right, starting from three ☥ signs which materialize the middle axis. The asymmetrical hieroglyphs, for instance 𓅿, 𓃒, 𓆰, 𓆷, 𓅬, etc., are facing left.

A similar observation can be made for the jambs of the door. They both contain the same inscription in one column, but with opposite direction.

On the left jamb, the asymmetrical hieroglyphs face right, that is to say towards the middle axis; see, for instance 𓏏, 𓅬, 𓆷, 𓀭 .

On the right jamb, the asymmetrical hieroglyphs face left, that is to say towards the middle axis; see, for instance 𓏏, 𓅬, 𓆷, 𓀭 .

Thus, by implementing the capacity of hieroglyphic writing to read in four directions, in horizontal lines, in vertical columns, from right to left and from left to right, the inscriptions are adapted to the structure of the monument on which they have been inscribed. Such a symbiotic adjustment would be impossible when one uses our modern writings.

7. Capacity of integrating into a representation

Not only is hieroglyphic writing basically a monumental script, but also, it is a script prone to interplay with representation.

We have seen that hieroglyphs were originally pictures to which were allotted the status of element of writing under certain constraints (§2.1 and

2.2). Now, it may happen that a hieroglyph could turn back to its origin as a picture.

7.1

A good illustration is afforded by hieroglyphs frozen as full-fledged emblem and then integrated into a representation. For instance, the biliteral phonogram ⌐ *s.t.* was often used to write the phonetic structure of Isis ' name, in graphy such as ⌐◯; ⌒ *t* is an alphabetic redundant mark of the feminine, and ◯ one of the determinatives indicating the class of goddesses. The phonogram ⌐ became a self content emblem of the goddess Isis, part of her representation, independently of any text.

FIGURE 7

Moreover, not only the phonogram ⌐⌐ alone, but the graphy ⌐⌐⌒ as a whole shares the same destiny and became a variant of the emblem of the older and simpler ⌐⌐.

7.2

Thanks to its multiple directions, a hieroglyphic inscription is closely bound to the representation to which it functions as a caption. As a rule, the signs should face in the same direction as the figure to which it refers. Let us have a look to this scene showing the pharaoh, on the left, being led by a god who turns his face towards him to a third god on the right.

FIGURE 8

The caption pertaining to the pharaoh is written out in four columns above him. It reads leftwards since the asymmetrical hieroglyphs – for instance ⌐ , ⌐ and ⌐ face right, that is to say in the same direction as the picture of the pharaoh.

FIGURE 9

Conversely, in the caption pertaining to the first god, whose name is Dedun, and written out in two columns above him, the asymmetrical hieroglyphs – for instance 𓂝, 𓆱, 𓄿 – face left, that is to say in the same direction as the picture of the god. However, reading goes from right to left, that is to say, the second column on right (1) is to be read before the column on left (2).

«(1) Dedun, who is at the head of Nubia, the great god, lord of sky (2), may he give all life, prosperity, energy, all joy when he acts.».

This is an example of retrograde direction: it is used here to fit to the particular position of the god: he is walking rightwards, but turning his head leftwards.

As regard the caption pertaining to Khnum, the second god, who is ram headed, the situation is simpler. It is written in four column in front of him and above him, reading from left to right, since the asymmetrical hieroglyphs face left, as does the god; see for instance 𓅓, 𓏏, 𓅓, 𓅭, etc.

«Words spoken by Khnum who-overpowers-the-bows at the gateways of the foreign countries in welcoming our son, belonging to our body, Thutmose. Come to us to the great mansion etc.»

7.3

Something more. A hieroglyph can be promoted to the status of a picture while at the same time, functioning as an element of the inscription. We have seen that to function as a sign of writing, a picture underwent the constraint of calibration (§2.2.1). Now it happens that a hieroglyph can be released from this constraint so as to assume in the same context both the function of a writing sign and the function of an image. Let us consider the following inscription.

FIGURE 10

It reads, in vertical column, downwards, from right to left:
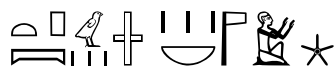
dw3 nṯrw nb(.w) jmyw p.t «Adoring all the gods who are in the sky».

Now, two hieroglyphs have been enlarged:

- The hieroglyph , an ideogram writing the word *dw3* «adore», the consonantal structure of which is made explicit by the triliteral phonogram .

- The hieroglyph , a phonogram writing the word *nb(.w)* «all».

So, they create the picture of a man in posture of adoration, kneeling on , a track of land encircled by water (in the Egyptian manner of rendering).

7.4

Sometimes, in this double function, a picture writing sign may be part of a representation that itself has its own self content caption in hieroglyphs. Let us consider these two columns from a royal monumental inscription of Ramses II.

FIGURE 11

FIGURE 12

The first column (1), on left, reads downwards and leftwards, since the asymmetrical signs face the right:

   sA ra ramssw-mr(y)-jmn «The son of Re, Ramses, beloved of Amun.»

The second column (2), on right, reads downwards and rightwards, since the asymmetrical signs face the left

   mr(y)-wsjr nʿrrf, «beloved of Osiris-Narref».

Narref is an epithet of Osiris, whose name is written by an ideogram

representing the god   .

First level

 and   function as full-fledged writing signs, the first as an ideogram for *s3* «son», the second as an ideogram for *wsjr* «Osiris».

Second Level

While functioning as writing signs, they also function as part of a self-content representation showing the god Osiris presenting life (☥) and prosperity (↑) to the nose of the «son (of Re)», one of the names of the pharaoh.

Third level

This representation has become enough autonomous to have its own caption, which reads in a column (3), downwards and rightwards, since the asymmetrical hieroglyphs ◁ and ⌒ face the left, as does the god Osiris:

r šr.t=k «to your nose».

7.5

In the previous instances, we have seen hieroglyphs functioning as a picture. Now, we are going to see how an element from a picture can function as a sign in an inscription adjacent to the picture. Let us consider again the scene from the wall of a temple of Nubia that has been shown previously (§ 7.2; FIGURE 8).

The ram headed god Khnum welcomes the pharaoh, led to him by the anthropomorphic god Dedun. Khnum is depicted making the traditional gesture of welcome, in Egyptian *nyny*: his hands are open, palms upwards, water flowing from them as indicated by the zig-zag, conventionally representing water by evoking its ripple.
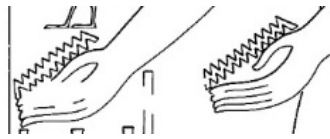
FIGURE 13

The words spoken by Khnum are inscribed in the columns starting in front of him:

> «Words spoken by Khnum who-overpowers-the-bows at the gateways of the foreign countries in welcoming our son, belonging to our body, Thutmose...»

In this inscription, the consonant of possessive suffix *n* in *s3=n* «our son» is not written out by a hieroglyphic sign. In stead of 𓆷 I I I, we have 𓆷 I I I, the space between the two signs being filled by the right hand of Khnum with zigzag indicating water in the palm. It is precisely this zigzag which plays the role of the missing alphabetic sign 〰, *n*. This has been made possible because this sign is originally an image representing rippling water.

8. Capacity of adding extra information while coding linguistic data

One of the main interests of the hieroglyphic writing lies in its highlighting a basic property with is more or less shared by any script: that is the capacity of using its physical appearance as a medium through which it can express specific meanings meanwhile conveying purely linguistic data. This capacity is implemented in the hieroglyphic at an utmost degree thanks to three features with which we have dealt.

- The multiplicity of direction.
- The figurativity: hieroglyphs are basically images.
- The coding resources: the combination of ideograms, phonograms and determinatives leaves open many variations in the graphies.

8.1

Playing on the multiplicity of the possible directions of reading can impart some particular effects. One of them is what is called by Egyptologists «honorific anticipation». For instance, let us consider the common expression ▯ *ḥw.t-nṯr* (read *hewt-netcher*), which means «mansion of the god, temple». From a linguistic point of view, it is a nominal phrase, composed of two elements, in first place, the element *ḥw.t* «mansion», functioning as a *regens* of a genitive relationship, in second place, the element *nṯr* «god» which is the *rectum*. Now, it is written with the element ▯ *nṯr*, «god» (see § 3.12) preceding the element ▯ *ḥw.t*, «mansion», contrary to the linguistic order.

Through such anticipation, the script expresses an idea which is not conveyed by the language, that is to say the fact that *nṯr* «god» belongs to beings and notions that deserve a special honorific treatment.

8.2

Another type of purely graphic meaning. In an inscription, the reversal of an asymmetrical sign as regard the general direction of reading can convey a specific meaning. For instance, in an inscription reading from left to right, asymmetrical signs are compelled to face left (§2.2.3). Now in the following passage ▯, the first hieroglyph ▯ functioning as an ideogram

for *ḥr* «Horus», has been reversed. It faces right while it should have faced left (*), like the following hieroglyph , an ideogram for *stẖ* «Seth». This is not a mistake, but a way of expressing by purely graphic means the verb «say». The fact that the hieroglyph for Horus faces the hieroglyph for Seth indicates that Horus is talking to Seth.

8.3

Generally speaking, a determinative by the mere fact of its indicating a class to which the word belongs brings some extra information in supplement of what is brought by purely linguistic means. Moreover, a sophisticated and skilful use of determinatives can enlarge the reach of such extra information. Example:

> The Egyptian word *mnmn.t* (read *menment*) «herd» is usually written , which may be explained in the following way:
>
> • twice the biliteral phonogram *mn*, with an alphabetic sign *n* making explicit its second consonant.
>
> • An alphabetic sign for *t*, feminine and collective ending.
>
> • Two determinatives: , class of cattle, and , class of plurality.

Now, other set of determinatives can be used, when one intends to give more precision. For instance, in the following graphy:

,

there are three determinatives. The number «three» conveys the notion of plurality, while the different signs indicate that the herd was composed of

cows (determinative ⚮), asses (determinative ⚮), and goats (determinative ⚮).

8.4

Specifically graphic meanings can arise not only from the determinatives, but also, from the choice of the elements implemented in the graphy of a word. Two examples are given (8.4.1 and 8.4.2).

8.4.1

The word *ḥḥ* (read *heh*) «eternity» is usually written 𓁹. Explanation: two alphabetical signs 𓉔 *ḥ* for the consonant structure; the determinative ⊙ indicates the belonging of the word to the class of notion of time; its position between the two 𓉔 and not after, as one would expect for a determinative, is already a graphical device.

Now, besides this usual graphy, there exist more sophisticated ones, such as the following: ⛰⊙⛰

The unusual phonetic value *ḥ* has been attributed to the two hieroglyphs ⛰, which represent a mountain. On the one hand, ⛰⊙⛰ writes *ḥḥ* «eternity», with two alphabetic signs and a determinative. But, on the other hand, the graphy as a whole is a picture showing the travel of the sun between the two mountains – the oriental mountain and the occidental mountain – that delimit the Egyptian horizon in the valley. This travel of the sun is repeated everyday, hopefully forever, and constitutes thus an illustration of the abstract notion of eternity.

8.4.2

Ptah is a high figure of the Egyptian pantheon; a strong tradition considers him as a god who created the world though rising the earth above the primordial flood.

The name of god Ptah is usually written out with three phonograms:

◻𐦥
◠𓏴

◻; commonly used as a standard phonogram for *p*.

◠; commonly used as a standard phonogram for *t*.

𓏴; commonly used as a standard phonogram for *ḥ*.

This basic phonetic writing may be completed with a such as 𓀭, member of the class of divine beings (§3.3). Besides, his name may be written with ideograms as 𓁧, 𓁨, by reference to his images (compare §4.4).

One can choice a more sophisticated writings such as 𓊪. Explanation:

▭, hieroglyph representing the sky vault; can function as an ideogram writing the word *p.t* «sky». Under acrophonic process, it can be used as a phonogram for the consonant *p*.

▬, a track of land; can function as an ideogram writing the word *t3* «earth». Under acrophonic process, it can be used as a phonogram for the consonant *t*.

𓀠, man with raised arms to show exultations; can function as an ideogram writing the word *ḥˁj* «rejoice». Under acrophonic process it can be used as a phonogram for the consonant *ḥ*.

Here, being used as phonograms, these three signs are arranged so as to draw a kind of picture that both:

- writes the consonants of the name of Ptah.
- evokes one of the main achievements of the god, his having lifted up the sky so that it became separated from the earth.

9

Such exploitations of the properties of the hieroglyphic system are known during the whole pharaonic period. However, they underwent a dramatic development during the Greco-roman period, that is to say when Egypt was under the rule of foreign powers. To maintain its identity threatened by this new environment, the pharaonic culture took a hard line on what was its major expression, the hieroglyphic writing. Its possibilities were systematically investigated. At stake, nothing less than the knowledge of the world. For ancient Egyptians, as many other people, thought that the words that named the element of the world and that the pictures that represented them conveyed something of their essences. Since hieroglyph writing combines in a symbiotic manner sounds and representations, exploiting the large range of its graphic capacities was a way of flushing out and highlighting the countless correspondences that unite between them the elements of the world. The priests who were still mastering hieroglyphs in the temples were fully aware that the «sacred philology» they were doing aimed at improving endlessly the understanding of the world.

Discussion: Hieroglyphic writing in ancient Egypt and its cognitive involvement

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Professor Pascal Vernus' paper explores the cognitive nature of the ancient Egyptian hieroglyphic writing system. It begins with the "figurativity" or the pictographic nature of Egyptian hieroglyphs. Then it points out that these hieroglyphic signs can be used as "full-fledged elements of writing" under the principles of (1) calibration; (2) spatial arrangement; and (3) orientation (2.2.1-2.2.3).

With hieroglyphic signs as a central element of a writing system, the paper's focus is given to the two distinct types (or better: functions) of hieroglyphs – that is, ideograms and phonograms. Ideograms directly refer to the concept of words but sometimes they can depict only parts of concept in a metonymic or metaphoric manner, as mentioned with detailed examples in the paper (3.1.2). Given that the ancient Egyptian lexicon allows notions to be conveyed by skeletal consonantal roots, hieroglyphs are also used as phonograms that directly represent the sound patterns of words based on the *rebus* writing.

In ancient Egyptian, words spelled with phonograms usually have an ideogram added at the end and this ideogram serves as a determinative – or a semantic classifier whose role is to resolve ambiguity between words written alike ("discriminative effect") and make it easier to separate words in the text ("demarcative effect": see 3.3.2).

All hieroglyphs have the potential to be used in each of the three different functions mentioned above. This results in the uniqueness of the ancient Egyptian writing system that is rarely found in any other civilization. The potential further leads to an integral use of hieroglyphs in visual representations throughout the history of ancient Egypt.

Regarding that uniliteral phonograms are found in their writing system we can assume that ancient Egyptians could have simplified their writing system to make it look more like an "alphabetic system." Apparently, some attempts were made by ancient Egyptians to simplify the writing system, as we can see in the so-called, the "group writing." In addition, the existence of cursive styles of writing, such as "hieratic" and "demotic," indicates their efforts to facilitate more fluent writing. Nonetheless, it seems that ancient Egyptians consistently and faithfully stood by their ostensibly cumbersome writing system. Why?

Professor Vernus answers this question with "extraordinary semiotic capacities" that the ancient Egyptian writing system possessed. They are:

capacity of fitting to an object or a monument (6);
capacity of integrating to an adjacent representation (7); and
capacity of adding supra-information while coding linguistic data (8).

The "capacity of fitting to an object or a monument" refers to the ability of hieroglyphic signs to be used in harmony with their architectural settings (see also 2.2.3.1). The "capacity of integrating to an adjacent representation"

is about their ability to interact with neighboring visual representations based on their dual properties of picture and sign (see also 2.1 and 2.2: for the integration see 7.1; for the caption see 7.2; for the ingenious exploitation of the dual properties and multilayered interactions between hieroglyphic signs see 7.3-7.5).

Finally, the "capacity of adding supra-information while coding linguistic data" deals with the established visual arrangements of hieroglyphic signs to deliver intended messages that cannot be expressed purely by linguistic means (for the "honorific transposition" see 8.1; for the intentional graphic arrangement to convey a specific meaning see 8.2; for the specific use of determinatives see 8.3; for the cryptic writing see 8.4). For this, ancient Egyptians dexterously employed the aforementioned features of hieroglyphic signs, which include (1) multiplicity of direction; (2) figurativity; and (3) various codifying devices stemming from the unique writing system of the ancient Egyptian language.

In sum, ancient Egyptians did not discard their complicated writing system because they believed that it was the perfect system for them to express the essence of the entire cosmos. Professor Vernus imparts his insightful observation about the ancient Egyptian writing system and the reason behind its longevity throughout pharaonic times. The ancient Egyptian writing system is not simply a way of coding linguistic data; rather it represents a highly visual and highly intuitive communication method that can deliver multilayered messages to educated readers (or viewers?). Moreover, his observation reminds us of the purpose of Egyptian monuments and other representational items. They are not intended to be viewed or admired by "art lovers." Their first and foremost purpose is to be functional, conveying highly codified messages through interactions of visual representations and hieroglyphic signs (that can double as an image) for eternity.

Question:

When we see different writings of some words (for instance, the word *kheper* meaning "to come to existence" or "to evolve"), we find that a hieroglyphic sign that is used as a phonogram (along with phonetic complements) in one writing can show up as a determinative in another. Would you explain the underlying principle (if there is any) regarding this phenomenon?