EGYPTOLOGY
MASTERCLASS

UNIT 3

Hieroglyphs and Their Decipherment

How the script works, how a line is read, and how Champollion broke it in 1822

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By the end of this unit, I should be able to answer these questions:

- Why did scholars before 1822 think hieroglyphs were symbols of ideas, and what showed that they also write sounds?
- What are uniliteral, biliteral, and triliteral signs, and what does a determinative add to a word?
- In which direction is a line of hieroglyphs read, and how can I tell from the signs themselves?
- What did the Greek text of the Rosetta Stone give Champollion, and what did his knowledge of Coptic give him?
- How did hieratic and Demotic develop from hieroglyphs, and what was each script used for?
- Can I read the names of Ptolemy, Cleopatra, Ramesses, and Tutankhamun in their cartouches?

For fourteen centuries nobody on Earth could read a line of Egyptian. The temples, the tombs, and the papyri of Unit 1 were covered in writing, and that writing was looked at, copied, admired, and explained in every way except the right one. This unit teaches the script first, as a scribe learned it, and then tells how it was read again in 1822. By the end you will read the names of four rulers in their cartouches yourself.

1 The stone and the state of knowledge in 1800

In July 1799, French soldiers were strengthening a fort at Rashid, the town the Europeans called Rosetta, on the western branch of the Nile (Figure 2). During the work they uncovered a slab of granodiorite, a dark and hard stone much like granite, with three bands of writing on one face. The officer of engineers in charge, Pierre-François Bouchard (1771-1822), understood what he was looking at and had it sent to the scholars who had come to Egypt with Napoleon's army. The **Rosetta Stone** is 112.3 cm high, 75.7 cm wide, 28.4 cm thick, and weighs about 760 kg, roughly as much as a small car. It is the lower part of a larger stela, an upright slab set up to carry an inscription, and its three texts are, from top to bottom, 14 lines of hieroglyphs with the top of the text broken away, 32 lines of Demotic, and 54 lines of Greek (Figure 1). When the French surrendered Egypt in 1801, the stone passed to the British, and it has stood in the British Museum since 1802.

The Greek could be read at once. It is a decree of the priests of Egypt, gathered at Memphis, in honour of the young king Ptolemy V, dated 27 March 196 BC, and it ends with the order that the decree be carved "in sacred, in native, and in Greek letters" on a stela in every major temple. That last sentence told the scholars what they had: the same text three times, in two scripts nobody could read and one everybody could. Unit 8 places Ptolemy V in his time; in this unit the stone matters only as the tool that opened the script.

What was known about the sacred script in 1800 came from Greek and Roman authors, and most of it was wrong. The Egyptian writer Horapollo, who probably lived in the fifth century AD, when the script was already dying, left a Greek book called the *Hieroglyphica* with 189 explanations of signs. His manuscript was found on the island of Andros in 1419, was printed in 1505, and shaped European thinking for three centuries. Some of his

statements rest on real knowledge. The vulture does write the word "mother", for example, because the Egyptian word for mother, *mwt*, was spelled with the vulture sign. His explanation, however, was that vultures are all female, so the bird signifies motherhood. In the same way he explained every sign as a symbol of an idea, and his readers concluded that hieroglyphs were a philosophical picture code and not a way of writing a language. The Jesuit Athanasius Kircher (1602-1680) built on this belief in his *Oedipus Aegyptiacus* of 1652 to 1654, in which he translated the signs on the obelisks of Rome into long mystical sentences that have no connection to the inscriptions at all. Kircher did leave one useful idea behind. He studied **Coptic**, the language of the Egyptian Christians, and argued that it was the last form of the language of the pharaohs. That idea was right, and Section 4 shows how Coptic became one of the three keys to the decipherment.

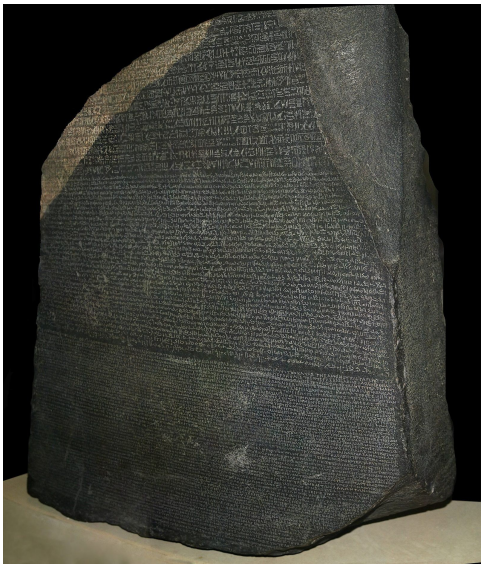


Figure 1. The Rosetta Stone in the British Museum. The hieroglyphic text at the top is the least complete, the Demotic in the middle is nearly complete, and the Greek at the bottom is complete except for its lower right corner. Credit: Hans Hillewaert, Wikimedia Commons, CC BY-SA 4.0.

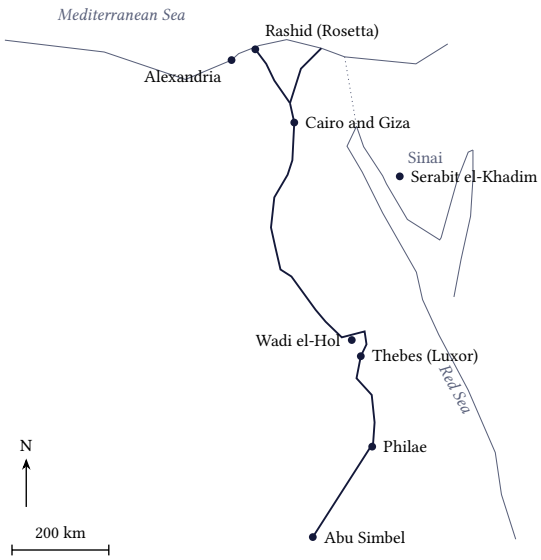


Figure 2. The places of this unit, drawn from their coordinates: Rashid, where the stone was found, Alexandria, Philae with its obelisk and its last inscription, Abu Simbel with the cartouches of Ramesses, Serabit el-Khadim with the Proto-Sinaitic inscriptions, and Wadi el-Hol, where two more early alphabetic inscriptions were found in 1993. The Nile and the coasts are simplified.

2 Sounds, words, and classifiers

The signs of the hieroglyphic script are pictures, and that is exactly what misled Horapollo's readers. A picture can be used in writing in two ways. It can stand for the thing it shows, and it can stand for the sound of the word for that thing. English children play the second game when they write "I can see" with an eye, a tin can, and the sea, and Egyptian scribes played it from the beginning of their writing, in the labels from the tomb U-j at Abydos of about 3300 BC that Unit 2 introduces.

KEY IDEA The rebus principle

A picture can write the sound of the word it shows, and that sound can then be used for any other word that sounds the same. The Egyptian word for the pintail duck is *z3*, so the picture of the duck can write the word *z3* "son", which has the same consonants. Without this step, pictures could only name things; with it, they can write every word of a language.

The Egyptian script made the rebus principle more powerful by one decision. The script records only the **consonants** of a word and leaves out the vowels. The duck therefore does not write the sounds of "pintail duck" with their vowels; it writes the consonant skeleton *z-3*, and any word with that skeleton can borrow it. Unit 1 explained what this means for modern readers, namely that every spelling such as "Khufu" or "Tutankhamun" is a convention with the vowels guessed. The Evidence in Detail box below gives the reasons for being sure that the vowels were left out of the writing and were not absent from the spoken language.

A sign used for its sound is a **phonogram**. Phonograms come in three kinds, sorted by the number of consonants they write. A **uniliteral** sign writes one consonant, such as the owl, G17, which reads *m*, or the water line, N35, which reads *n* (the codes are those of the standard sign list, which is explained at the end of this paragraph). A **biliteral** sign writes two consonants, such as the house plan, O1, which reads *pr*. A **triliteral** sign writes three, such as the sign of the windpipe and heart, F35, which reads *nfr*. There are about 25 uniliteral signs, which Section 3 presents in full, about 80 biliteral signs in common use, and a few dozen triliterals. Together the signs in regular use in the Middle Kingdom number about 700 to 900. The standard list of them was first printed by Alan Gardiner (1879-1963) in his grammar of 1927, and its final edition of 1957 has 763 signs sorted into 26 groups. The codes such as G17 and N35 come from that list: the letter names the group and the number is the sign's place inside it. In the temples of the Ptolemaic Period the scribes multiplied the signs to more than 5,000, which is one reason the latest inscriptions are among the hardest.

A sign that stands for the thing it shows is a **logogram**, a word sign. The house plan, O1, used as a logogram writes *pr* "house", and a scribe usually marked this use with a short vertical stroke, Z1, under or beside the sign. Figure 3 shows the same house plan in both roles. As a logogram with the stroke it is the word "house". As a phonogram it supplies the consonants *p-r* to the verb *prꜣ* "to go out", which has nothing to do with houses, and the walking legs at the end of that word tell the reader which word is meant.

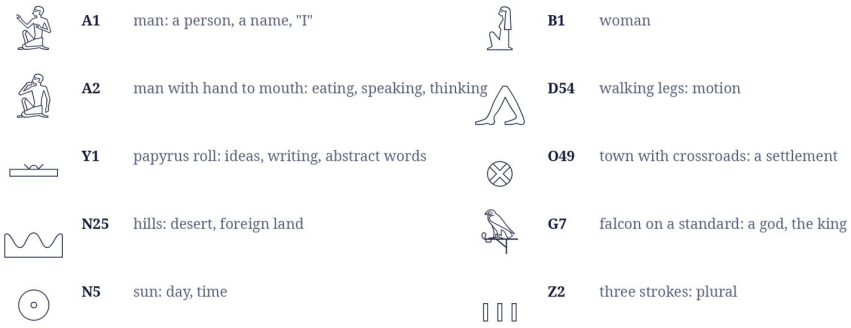
Those legs are the third kind of sign. A **determinative** is a sign placed at the end of a word that is not read aloud and that tells the reader what class of thing the word belongs to: a man for names and persons, a pair of legs for words of motion, a sealed papyrus roll for abstract ideas, a town plan for places, three strokes for a plural. Figure 4 shows ten of the commonest. Many Egyptologists now call them **classifiers**, because that is what they do; the unit uses both words. Determinatives make up for the missing vowels. A skeleton of consonants such as *pr* could be several words, and the determinative sorts them out, as the walking legs do for "go out". They also mark where one word ends and the next begins, since the script uses no spaces between words.



	pr	'house'	logogram with the stroke
	prỉ	'go out'	phonogram pr, complement r, walking legs as determinative
	rn	'name'	two uniliteral signs
	nfr	'good, beautiful'	triliteral nfr with the complements f and r
	ʿnḫ	'life, to live'	triliteral ʿnḫ with the complements n and ḫ
	ḥtp	'offering, to be at peace'	triliteral ḥtp with the complements t and p
	ms	'to give birth, be born'	biliteral ms with the complement s
	zꜣ	'son'	the pintail duck used for a word that sounds the same

Figure 3. Eight words that show the three functions of a sign. Each row gives the signs, the transliteration, the meaning, and the role of each sign. Rendered from the font Noto Sans Egyptian Hieroglyphs.

One last device completes the toolkit. A biliteral or triliteral sign is often followed by one or two uniliteral signs that repeat part of its sound. In *nfr*, the triliteral F35 is followed by the horned viper *f* and the mouth *r*, and the word is still read *nfr*, with three consonants and not five. These helpers are **phonetic complements**. They tell the reader which of several possible values a sign has, they make the word recognizable at a glance, and they neatly fill the imaginary square into which a scribe fitted his signs, a habit that Section 3 explains.



A1	man: a person, a name, "I"	**B1**	woman
A2	man with hand to mouth: eating, speaking, thinking	**D54**	walking legs: motion
Y1	papyrus roll: ideas, writing, abstract words	**O49**	town with crossroads: a settlement
N25	hills: desert, foreign land	**G7**	falcon on a standard: a god, the king
N5	sun: day, time	**Z2**	three strokes: plural

Figure 4. Ten common determinatives with their Gardiner codes and the class of meaning each marks. Rendered from the font Noto Sans Egyptian Hieroglyphs.

KEY IDEA The three functions of a sign

Every hieroglyph does one of three jobs in a given word: it writes one, two, or three consonants (a phonogram), it writes a whole word as a picture (a logogram, usually marked with a stroke), or it classifies the word without being read (a determinative). A phonetic complement is a uniliteral phonogram that repeats part of the sound of the sign before it. The same sign can do different jobs in different words.

WORKED CASE Writing nfr, ꜥnḫ, and pr with and without their helpers

Take the three words of Figure 3 that most museum visitors meet first.

The sign F35 alone reads *nfr* "good, beautiful". Scribes almost always add the complements *f* (the horned viper, I9) and *r* (the mouth, D21) after it. The written word then has three signs, but it still has three consonants, and the complements add nothing to the sound. To write *nfrt* "a beautiful woman", a scribe adds the loaf *t* (X1) for the feminine ending and the seated woman (B1) as determinative.

The sign S34 alone reads *ꜥnḫ* "life, to live", the sign known on every souvenir stall as the ankh. Here the usual complements are *n* (N35) and *ḥ* (Aa1), and again they repeat sounds the triliteral already carries, so the word stays *ꜥnḫ*.

The house plan O1 with the stroke Z1 reads *pr* "house". The same O1 followed by the complement *r* and the walking legs D54 reads *pr·i* "to go out". In that second word O1 is a phonogram, the mouth is its complement, and the legs are the determinative.

So the rule for a reader is: count the consonants of the big sign once, treat the small signs after it as repeats, and read the last picture as a label, not a sound.

EVIDENCE IN DETAIL How we know the vowels are missing

Three independent kinds of evidence show that the script left out the vowels, and not that the Egyptian language had none.

The first kind of evidence comes from foreign names. When the scribes of the Ptolemaic Period wrote Greek names such as Ptolemaios and Kleopatra, they used one sound sign for each consonant. For the Greek vowels, which the script had no signs for, they borrowed a few signs that were consonants in Egyptian: the reed leaf *i* for *e* and *i*, the lasso *wꜣ* and the quail chick *w* for *o* and *u*, the vulture *ꜣ* for *a*. The Greek vowels forced the scribes to improvise, which shows that the ordinary system had no place for them.

The second kind comes from Coptic. The Egyptian Christians wrote their language from the third century AD onwards in Greek letters, which have vowels, and Coptic words preserve the vowels of the older language. The Egyptian word for "man", written *rmṯ* in hieroglyphs, appears in Coptic as *rōme*, so the hieroglyphic spelling must have dropped an o and an e that were really spoken.

The third kind comes from transcriptions in cuneiform, the wedge-shaped script of Mesopotamia. The scribes of Babylon and Assyria, whose script does write vowels, spelled Egyptian names in their letters and treaties of the fourteenth to seventh centuries BC. Amenhotep III appears in the Amarna letters, the clay-tablet correspondence of the fourteenth century BC found at Amarna, as Nimmuareya, a version of his throne name *nb-mꜣꜥt-rꜥ*, and these spellings confirm vowels that the Egyptian script never shows.

Together the three sources let Egyptologists reconstruct many ancient vowels, but not all, and never from the hieroglyphs alone. The conventional pronunciations of Unit 1 fill the gaps with an *e* so that the words can be spoken at all.

CHECK YOUR UNDERSTANDING Question 1

The house plan O1 appears both in pr 'house' and in pr·i 'go out'. What tells a reader which word is meant?

(A) The sign that follows: a stroke for 'house', the walking legs for a word of motion

(B) The direction the house plan faces: it faces left for 'house' and right for 'go out'

(C) The vowel signs written after the house plan, which differ between the two words

(D) The size of the house plan, which is drawn larger when it is a logogram

The solution is at the end of the unit.

The pictures of the script had one more consequence, which was that people who could not read Egyptian could still recognize the pictures. In Egypt perhaps one in a hundred people could read and write. Outside Egypt, in Sinai, that gap between seeing and reading is where the research spotlight of this unit places the invention of the alphabet.

RESEARCH SPOTLIGHT

Orly Goldwasser *Hebrew University of Jerusalem*

The alphabet was invented by people who could see hieroglyphs but not read them

At Serabit el-Khadim in southern Sinai (Figure 2), the Egyptians mined turquoise and built a temple of Hathor, and Canaanite workers from the Levant, the coast to the north-east of Egypt, worked beside them. In 1905 Flinders Petrie (1853-1942) found short inscriptions there in an unknown script of about thirty picture-like signs, now called Proto-Sinaitic, and in 1916 Alan Gardiner read one of its words as *bʿlt*, "the Lady", the Canaanite title of Hathor. The signs are the ancestors of the Phoenician, Greek, and Latin letters.

Orly Goldwasser asks who made them and how. She compares each Proto-Sinaitic letter with the hieroglyphs on the Egyptian stelae of the site and argues that nearly every letter has a model there. The inventors, in her reconstruction, were Canaanite miners around 1840 BC who could not read Egyptian and knew only the pictures. They took a picture, named it in their own language, and let it stand for the first sound of that name: the Egyptian house sign became *bet* and wrote *b*, the water line became *mem* and wrote *m*. This rule, that a picture stands for the first sound of its own name, is called the acrophonic principle, and it is why they never used the Egyptian uniliteral signs, which would have given them an alphabet ready-made, and why the letters look like hieroglyphs but have different values. Her position is contested. Christopher Rollston, who teaches Semitic languages at George Washington University, and others argue that the inventors were literate officials inside the Egyptian administration, and her reply of 2012, listed in the further reading, answers them. The date of the inscriptions, between about 1850 and 1500 BC, is also still debated.

Read the paper: Goldwasser (2006), Canaanites Reading Hieroglyphs: Horus is Hathor? The Invention of the Alphabet in Sinai, Ägypten und Levante 16, 121 to 160

3 Reading a line

Figure 5 shows the uniliteral signs in the order of the Leiden list of Unit 1, with their Gardiner codes. They are the signs a beginner learns first, because every foreign name and many Egyptian words are spelled with them alone, and because the complements of the bigger signs are taken from them. Two of the values need a note. The vulture *ꜣ* and the forearm *ʿ* stood for sounds that English does not have, the second of them made deep in the throat; Egyptologists speak both as *a*. The reed leaf *i̯* is written *j* in the grammar of the American Egyptologist James Allen and in many German books, and the hill slope *q* is written *ḳ* in Gardiner's grammar; the values are the same, only the letters differ.

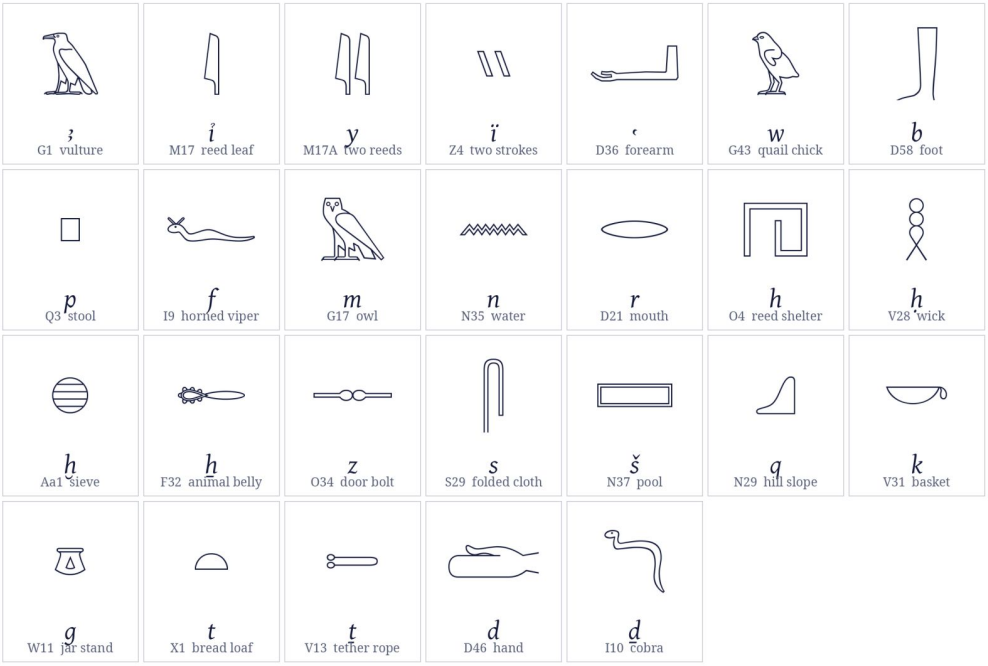


Figure 5. The uniliteral signs with their Leiden values, Gardiner codes, and the objects they show. The two reeds and the two strokes both write the sound *y*, which the Leiden list writes as *y* and *ỉ*. Rendered from the font Noto Sans Egyptian Hieroglyphs.

Signs can be written in horizontal lines or in vertical columns, and a line can run from left to right or from right to left. The script has no fixed direction, and this freedom was used on purpose: on the two sides of a doorway the signs usually face the opening, so that both inscriptions begin at the door and run away from it. The reader is never left to guess, because the signs themselves say where to begin.

PRINCIPLES The reading rules of the hieroglyphic script

1. Signs that show a person or an animal face the beginning of the line. A line is read into the faces: if the birds and people look left, the reader starts at the left and reads to the right, and the other way round.
2. Signs stacked on top of one another within a line are read from top to bottom before the reader moves on; signs set side by side within a column are read in the direction of the faces before the reader moves down.
3. A column is read from top to bottom, and the columns follow one another in the direction the signs face.
4. Signs are arranged to fill an imaginary square, which Egyptologists call a quadrat. Two or three flat signs share one square, and the order inside the square follows rules 1 and 2.
5. A royal name is written inside an oval, the cartouche, and the sign order inside it follows the same rules as outside.

The first rule is the one a museum visitor uses most. It also explains a convention of this unit: the plates (the figures that show rows of signs) and the interactive element show the signs facing left, so they are read from left to right, in the direction of English. On the monuments, by contrast, the inscriptions far more often face right and are read from right to left (Figure 6). The second and fourth rules explain why a printed line of hieroglyphs does not look like a row of letters. A scribe who had to write the loaf *t* above the stool *p* would never leave half a square empty; the flat signs share the space, and the eye of the reader learns to take a square at a time.

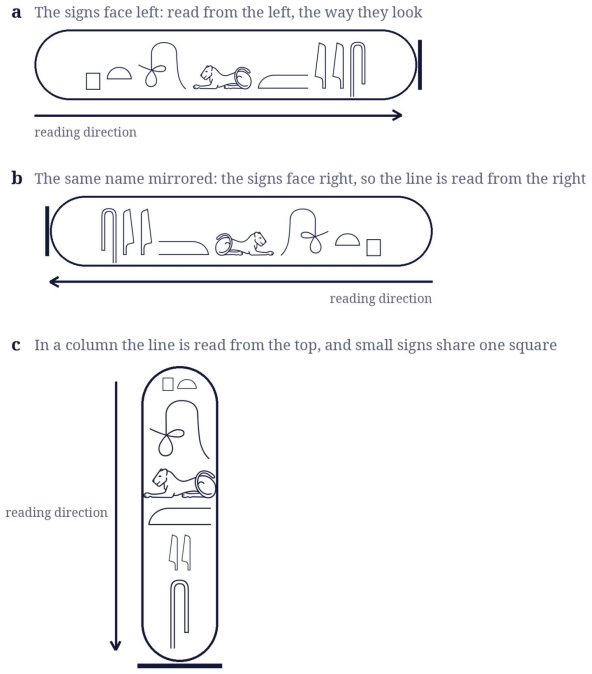


Figure 6. The name of Ptolemy in three arrangements: (a) facing left and read from the left, (b) mirrored, facing right and read from the right, and (c) in a column, read from the top, where the loaf shares a square with the stool and the two reeds share another. The bar at the end of each cartouche marks the end of the reading direction. Rendered from the font Noto Sans Egyptian Hieroglyphs.

KEY IDEA The cartouche

A cartouche is a loop of rope drawn around the signs of a king's or a queen's name and tied at one end. It was the first thing the decipherers could identify in an unknown text, because they knew from the Greek which royal names the text had to contain and where. Two of the five names of a king stand in cartouches, the throne name and the birth name; the other three names lie beyond this unit.

WORKED CASE Telling the reading direction of a given plate

Figure 6b shows a cartouche as it might stand on the right side of a doorway. The question is where to start reading.

The lion faces right, and so do the reed leaves, whose tips point right. By rule 1, the reader starts at the right end. The bar that ties the cartouche stands at the left end, which is the end of the name, and this agrees with the rule. Reading from the right, the first sign is the stool, *p*, then the loaf, *t*, the lasso, *w*, the lion, *l*, the sign for *m*, the two reeds, *y*, and the folded cloth, *s*: the same name as in Figure 6a, written in the other direction.

So the plate is read from right to left, starting at the stool. A reader who started at the left would get *symlwtp* and no name at all.

CHECK YOUR UNDERSTANDING Question 2

In a carved line of hieroglyphs the owl, the quail chick, and a seated man all face to the right. Where does the reader begin?

(A) At the left end, because Egyptian lines run like Latin ones

(B) At the cartouche, if there is one, and otherwise at the left

(C) At the right end, because a line is read into the faces of its signs

(D) At the top, because any line with a seated man is really a column

The solution is at the end of the unit.

4 The decipherment

1799 July: French engineers find the stone at Rashid (Rosetta)
1801 The stone passes to Britain; in the British Museum from 1802
1802 Silvestre de Sacy and Åkerblad: royal names in the Demotic
1814 Thomas Young begins; by 1815 he links Demotic to hieroglyphs
1819 Young's article "Egypt": Ptolemy and Berenice in cartouches
1821 Bankes's obelisk from Philae reaches London and is lithographed
1822 January: Champollion reads Cleopatra on the obelisk copy
1822 14 September: Ramesses and Thutmose in Huyot's copies
1822 27 September: the *Lettre à M. Dacier* is read at the Académie
1824 *Précis du système hiéroglyphique*: the full system
1826 Champollion curator of the Egyptian collection at the Louvre
1828 The Franco-Tuscan expedition to Egypt (1828 to 1829)
1832 4 March: Champollion dies in Paris, aged 41
1836 His *Grammaire égyptienne* appears after his death
1837 Lepsius's letter to Rosellini explains the multiliteral signs

Figure 7. The decipherment of the Egyptian scripts from the find of the stone to the explanation of the multiliteral signs, with the dates of each step.

The decipherment was done by a chain of people over 23 years, and Figure 7 lists the steps. Copies of the stone's three texts were printed in Paris and London from 1800, and the first results came from the Demotic, the middle text, because it was nearly complete and because its signs, which look like a cursive alphabet, invited the methods used for other unknown scripts. In 1802 the French orientalist Antoine-Isaac Silvestre de Sacy (1758-1838) found the groups of Demotic signs that had to be the names Ptolemy, Alexander, and Arsinoe, by counting where the names stood in the Greek and looking at the same places in the Demotic. In the same year the Swedish diplomat Johan David Åkerblad (1763-1819) went further and proposed an alphabet of 29 Demotic signs, of which about half were right, and read several Egyptian words in the Demotic with the help of Coptic. Both men then stopped, Sacy because he believed the Demotic was not purely alphabetic, which was true, and Åkerblad because he believed it was, which was not.

The next step was taken in England by Thomas Young (1773-1829), a physician whose experiments had shown that light is a wave. Young began on the stone in 1814 and soon noticed that many Demotic signs were simplified forms of hieroglyphs, so that the two scripts were one system in two styles. He then did what Sacy had done, but with the hieroglyphs: he located the cartouche of Ptolemy, matched its signs to the sounds of the Greek name, and from a copy of an inscription of Ptolemy and his queen Berenice did the same for her name. In the article "Egypt" that he wrote in 1818 for the supplement of the *Encyclopaedia Britannica*, published in 1819,

Young proposed 13 sign values, of which six were right and three partly right, and he recognized the ending that marks a woman's name. He also drew the wrong general conclusion. Young believed that hieroglyphs wrote sounds only when a foreign name had to be fitted into the script, and that Egyptian words themselves were written symbolically, as Horapollo had said.

The man who proved otherwise was Jean-François Champollion (1790-1832), born at Figeac in southern France, a student of Sacy's in Paris, and a reader of Coptic since his teens. Champollion's method rested on three things, which the Key Idea below names, and the first two came together in a lithograph, a printed copy of an inscription, that reached him in January 1822. The English traveller William John Bankes (1786-1855) had found an obelisk at Philae in 1815. Its base carries a Greek inscription naming a Ptolemy and a Cleopatra, and its shaft carries two cartouches. Bankes had the obelisk shipped to his house in Dorset, where it still stands. He had the inscriptions lithographed, and a copy went to Paris. Champollion now had two cartouches with four signs in common, and the first two worked cases below follow his reading of them.

WORKED CASE Reading the cartouche of Ptolemy

Figure 8, first row, shows the cartouche as it stands on the Rosetta Stone, with the signs numbered in reading order. The Greek text gives the name as Ptolemaios, which Egyptian scribes heard as the consonants *p-t-w-l-m-y-s*.

Sign 1 is the stool, *p*. Sign 2 is the loaf, *t*. Sign 3 is the lasso, which reads *w3* in Egyptian and was used for the Greek *o*. Sign 4 is the lion, which reads *rw* in Egyptian and was the scribes' sign for the *l* that their own language rarely used. Sign 5 is the sign Aa15, a second sign for *m*. Signs 6 and 7 are two reed leaves, *y*, for the *ai* of the Greek. Sign 8 is the folded cloth, *s*. On the stone the cartouche continues with the epithets "living forever, beloved of Ptah", titles of praise added to the name; Young had noticed that these titles make the difference between the long and the short form of the name on the stone.

Read in order, the eight signs give *ptwlmys*, the name Ptolemy, and each sign has received one sound value that must now hold wherever the sign appears.

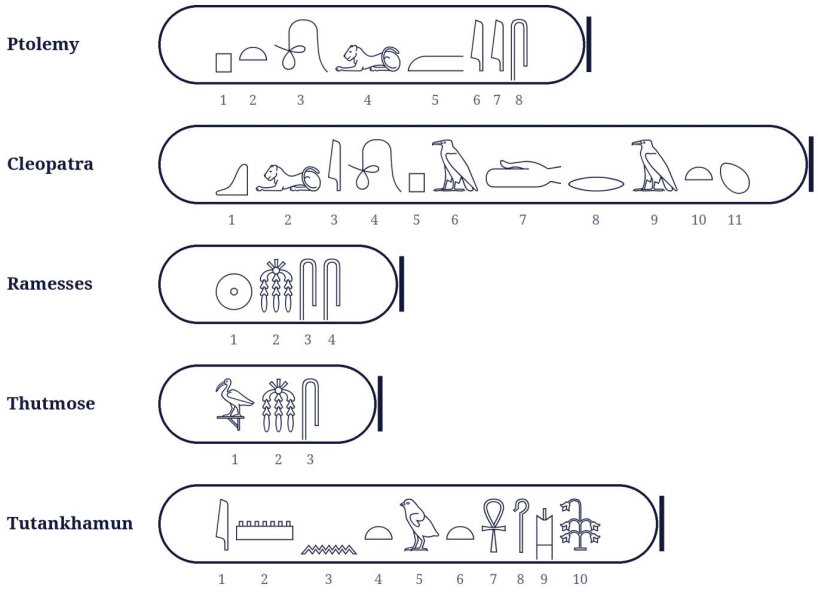


Figure 8. The five cartouches of this unit with the signs numbered in reading order: Ptolemy as on the Rosetta Stone, Cleopatra as on the Philae obelisk, Ramesses and Thutmose as Champollion read them in 1822, and the birth name of Tutankhamun with its epithet. The signs are set in a line for clarity; on the monuments the flat signs share squares. Rendered from the font Noto Sans Egyptian Hieroglyphs.

WORKED CASE Reading Cleopatra and matching the shared signs

The second row of Figure 8 is the cartouche from the Philae obelisk. The Greek on the base names a Cleopatra, which the scribes wrote as *q-l-ỉ-w-p-ꜣ-d-r-ꜣ-t*.

Four signs are already known from Ptolemy, and they stand where the Greek letters say they should. The lion, *l*, is sign 4 of Ptolemy and sign 2 of Cleopatra, as *l* is the fourth letter of one name and the second of the other. The stool, *p*, is first in Ptolemy and fifth in Cleopatra. The lasso, *o*, is third in Ptolemy and fourth in Cleopatra. The reed leaf stands near the end of Ptolemy for the *ai* and third in Cleopatra for the *e*. These four agreements are the test: the same signs carry the same sounds in both names, which could not happen if the signs were symbols of ideas.

The new signs then receive their values from the Greek. Sign 1, the hill slope, is *q*, for the Greek *k*. Sign 6 and sign 9, the vulture, are *a*. Sign 8, the mouth, is *r*. Sign 7, the hand, stands where the Greek has a *t*, but Ptolemy writes *t* with the loaf, so Champollion took the loaf and the hand for two signs with the same sound. Modern readers know that the hand is *d* and that the scribes sometimes rendered a Greek *t* with it. Signs 10 and 11, the loaf and the egg, are not part of the Greek name at all. They are the feminine ending *t* and the determinative of a woman's name, which Young had seen on Berenice.

The cartouche reads *qlỉwpꜣdrꜣt*, the name Cleopatra, and twelve signs now have values, four of them confirmed by both names.

By the summer of 1822 Champollion had used the same method to read a dozen more Greek and Roman names, among them Alexander, Berenice, Caesar, and Trajan, and had an alphabet of about twenty values. All of them were foreign names, and he still shared Young's doubt about Egyptian words. The doubt ended on 14 September 1822, when the architect Jean-Nicolas Huyot (1780-1840) sent him copies of inscriptions from the rock temple of Abu Simbel in Nubia, far up the Nile (Figure 2), a temple that no Greek king had built, so that any name in its cartouches had to be Egyptian.

WORKED CASE Reading Ramesses and Thutmose with Coptic

The third row of Figure 8 shows the cartouche that Champollion found in Huyot's copies: a sun disc, a sign of three animal skins tied together, and two folded cloths.

Two of the signs were already known. The folded cloth was *s* from the Greek names. The sign of the three skins, F31, stood on the Rosetta Stone at the place where the Greek speaks of the king's birthday, so it had to mean "birth". The sun disc could not be a letter in a Greek name, since no Greek name began with it, so Champollion asked what the Egyptians called the sun. Coptic gave the answer, *rē*, and it also gave the verb "to give birth" as *mise*, which supplied the sounds of the birth sign. Read in order, the cartouche gave *rᶜ-ms-s*, which is Ramesses, the name of the kings that Manetho's lists and the Bible had preserved. The name means "Re is the one who bore him"; on other monuments the last sound is written with the sedge plant, M23, instead of the second cloth.

The fourth row confirmed the reading. An ibis on a standard, the bird of the god Thoth, stands before the same birth sign and the same cloth: *ḏḥwty-ms*, Thutmose, the name of four kings of the Eighteenth Dynasty that the Greek writers had recorded as Tuthmosis.

So the sun disc and the birth sign spelled Egyptian words by their Egyptian sounds, and the script wrote sounds for native words as well as for foreign ones. Champollion ran to his brother at the Institut de France in Paris, said "Je tiens mon affaire", "I have it", and collapsed; he recovered in a few days and wrote the *Lettre à M. Dacier*, which he read to the Académie des Inscriptions on 27 September 1822 with Young in the audience.

KEY IDEA What the decipherment rested on

The decipherment needed three things together: a bilingual text, which fixed the content and gave the Greek names; royal names in cartouches, which could be located in the unknown text and spelled sound by sound; and Coptic, which gave the sounds and meanings of Egyptian words so that native names and ordinary words could be read. A bilingual alone would have given a translation but not a reading.

EVIDENCE IN DETAIL How the value of a sign is established

The chain of evidence behind one sign value, the lion for *l*, shows why the decipherment is secure and not a guess.

The Greek text of the Rosetta Stone names Ptolemy; the Greek base of the Philae obelisk names Ptolemy and Cleopatra. On each monument the Egyptian text contains cartouches at the places where the Greek has the names, which fixes which cartouche is which. The lion stands fourth in one cartouche and second in the other, and *l* is the fourth letter of Ptolemaios and the second of Kleopatra. One agreement could be chance; the second, together with the stool, the lasso, and the reed, which also agree, rules chance out. The value then has to hold in every other cartouche, and it does: the lion stands second in Alexander, where the Greek has *l* in second place, and it is absent from Berenice, whose Greek name has no *l*.

Champollion's last step was to explain why the lion of all signs was chosen. The Egyptian word for lion is *rw*, and Egyptian had no separate sign for *l* because the language rarely distinguished the two sounds; the scribes took the sign whose sound came closest. That is the rebus principle of Section 2 at work in the latest period of the script, and it is the reason why the values found in Greek names could be carried back three thousand years to the pyramids.

The *Lettre* dealt only with Greek and Roman names. In the *Précis du système hiéroglyphique* of 1824 Champollion laid out the whole system, sound signs, word signs, and determinatives together, in his words "figurative, symbolic, and phonetic at the same time, in the same text, the same sentence, and almost the same word". He read the list of kings that Bankes had found at Abydos, led an expedition to Egypt in 1828 and 1829, and died in Paris on 4 March 1832 at 41, with his grammar and dictionary unpublished; the grammar appeared in 1836. One correction was still to come. Champollion had treated most signs as single-sound signs, a large alphabet in which many signs were alternatives for the same sound. In a letter to the Italian Egyptologist Ippolito Rosellini published in 1837, Karl Richard Lepsius (1810-1884) showed that many of them were biliteral and triliteral signs with complements, as Section 2 described them, and reduced the true alphabet to about thirty signs.

CHECK YOUR UNDERSTANDING Question 3

In the cartouche of Cleopatra the seventh sign, where the Greek name has a t, is a hand, while Ptolemy writes its t with a loaf. How did Champollion explain this, and what is the modern reading?

(A) He took the hand for a determinative that marks a queen's name; today it is read as the feminine ending t of the name

(B) He took the loaf and the hand for two signs of one sound; today the hand is read d, which the scribes also used for a Greek t

(C) He concluded that the copy of the obelisk was faulty at that sign; today the sign is known to be a loaf after all

(D) He concluded that the name was not Cleopatra but Berenice; today the cartouche is read as the name Arsinoe

The solution is at the end of the unit.

EXCURSION *Young and Champollion, a fair account*

The question of who deciphered the hieroglyphs was fought in print within a year and has been fought ever since, partly as a quarrel between England and France. The facts are not in dispute. Young published first, in 1819, a correct identification of the cartouche of Ptolemy, several correct sign values, and the feminine ending, and he was the first to see that Demotic and hieroglyphs were one system. He did not publish a general method and he explicitly denied that Egyptian words were written phonetically. Champollion read Young's article, and his early notes show that he used Young's results, which he later minimized. Bankes believed that Champollion took the name Cleopatra from a note Bankes had written in the margin of his lithograph. From 1822 onwards everything decisive was Champollion's: the use of Coptic, the reading of Ramesses and Thutmose, and the system of the *Précis*, which Young never matched and which is the system every Egyptologist still uses. Young himself, in the book he published in 1823, called the result his own original alphabet as extended by Champollion, and Champollion refused to accept any original alphabet but his own. The usual verdict, that Young found the first sound values and Champollion deciphered the script, is a fair one.

5 Hieratic, Demotic, and the end of the script

Hieroglyphs were the script of stone. A scribe writing a letter, an account, or a story on papyrus with a reed brush and ink did not draw an owl with every feather. From the first dynasties the Egyptians used a cursive form of the same system in which each sign became a few quick strokes, and this cursive is called **hieratic**, from the Greek word for "priestly". The name comes from the end of the script's life: when the Greek writer Clement of Alexandria (about AD 150-215) described the Egyptian scripts, hieratic was by then used mostly by priests for religious books. Clement named three kinds of Egyptian writing, the letter script of daily life (which is the Demotic described below), the hieratic, and the hieroglyphic, and his names have remained in use. Figure 9 shows the relation between a hieroglyph and its hieratic forms on a plate of the reference work that Egyptologists still use.

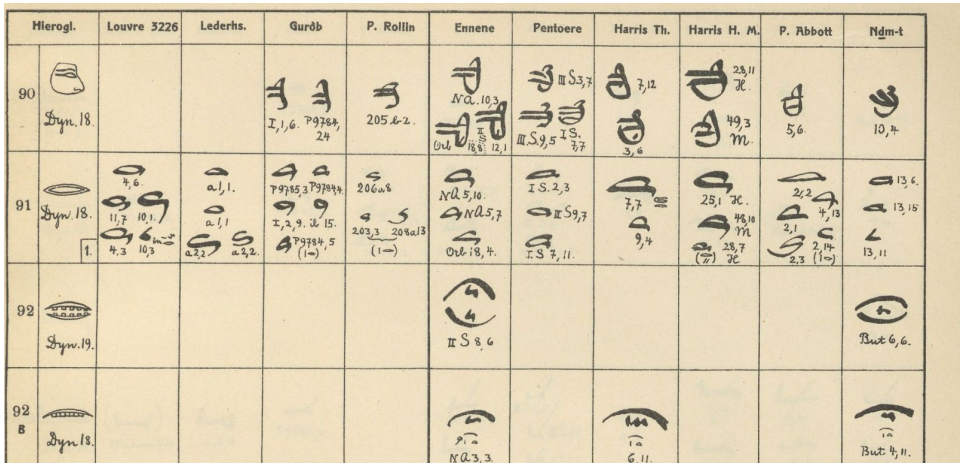


Figure 9. Four rows of plate 8 in volume II of Georg Möller's *Hieratische Paläographie* (1909): the hieroglyph in the first column (the nose, the eye, the painted eye, and the eyebrow) and its hieratic forms in ten manuscripts of the New Kingdom and the Twenty-first Dynasty, named in the column headings, from the reign of Thutmose III on the left to the Twenty-first Dynasty on the right. Credit: Georg Möller, 1909, public domain, via Wikimedia Commons.

Hieratic has three features a reader must know. It is always written from right to left, whatever the monuments do. It is a script of ligatures, in which neighbouring signs run together and a sign changes its shape with its neighbours, so that it has to be learned as a script in its own right and not as a shorthand that any reader of hieroglyphs can follow. And it is the script in which nearly all Egyptian literature, science, and administration survives: the Tale of Sinuhe, the medical and mathematical papyri, the records of the tomb builders of Deir

el-Medina in Unit 7, and the letters of ordinary people were all written in hieratic. Hieroglyphs, by contrast, were for monuments and for texts meant to last, such as the Book of the Dead of Unit 6, which was often written in a careful form halfway between the two.

Around 650 BC, in the Nile Delta under the Twenty-sixth Dynasty, a still faster cursive developed out of the form of hieratic that the offices of the north used for business, and it spread over the whole country within a few generations. The Greeks called it **Demotic**, "popular", a name that Herodotus (about 484-425 BC) already uses. In Demotic the signs are so far from their pictures that even an Egyptologist cannot see the owl in the stroke that writes *m*, and groups of signs became fixed spellings of whole words. Demotic was the script of contracts, letters, tax receipts, and, from the Ptolemaic Period, of stories and religious texts too. It is the middle text of the Rosetta Stone, and it is what the Greek decree means by "native letters". Table 1 sets the four scripts side by side.

Script	In Use	Direction	Typical Use
Hieroglyphic	3300 BC to AD 394	either	monuments, tombs, temples
Hieratic	3000 BC to AD 250	right to left	letters, accounts, literature
Demotic	650 BC to AD 452	right to left	contracts, receipts, letters
Coptic	AD 250 to today	left to right	Christian texts, the liturgy

Table 1. The four scripts of the Egyptian language. The dates are approximate and are those of the earliest and latest known texts; hieratic survived in religious books into the third century AD, and Coptic is still read aloud in the services of the Coptic Church.

The script did not die all at once. Greek became the language of government after Alexander the Great conquered Egypt, and by the end of the third century BC a Demotic contract needed a Greek note of registration to be valid. Under Roman rule Demotic withdrew from public life altogether. Knowledge of hieroglyphs shrank to the temples, where the priests kept carving and even multiplied the signs, and the temples themselves lost their income and their standing as Egypt became Christian. The Egyptian Christians kept the language and dropped the script. From the third century AD they wrote Egyptian in the Greek alphabet with six or seven extra letters borrowed from Demotic for sounds that Greek lacked, and this **Coptic** script, with vowels at last, is the one in which the last stage of the language survives.

EXCURSION *The last inscription, and the language that did not die*

The island of Philae lies at the First Cataract, and its temple of Isis stayed open longer than any other because the Nubian tribes to the south still worshipped there. On a wall of the gate of Hadrian in that temple, a priest named Esmet-Akhom carved a figure of the Nubian god Mandulis and wrote beside it, in hieroglyphs and in Demotic, that he had done so. The Demotic gives the date: the birthday of Osiris in year 110 of Diocletian, which is 24 August AD 394. It is the latest hieroglyphic inscription known. The last Demotic text, a graffito in the same temple, followed in December AD 452, and the temple was closed by the emperor Justinian about AD 535. Fourteen centuries then passed before anyone read Esmet-Akhom's lines again.

The language outlived the script by a long way. Coptic was the daily speech of Egypt for centuries after the Arab conquest of 641, was slowly replaced by Arabic, and had stopped being a spoken language by the seventeenth century at the latest. It never stopped being read, because the Coptic Church kept it as the language of its services, and the Coptic grammars and dictionaries that European scholars compiled from the seventeenth century on were the books from which Champollion learned the sounds that unlocked the cartouche of Ramesses. The Coptic Bible and the Pyramid Texts of Unit 6, some 2,600 years apart, are written in the same language.

6 Reading royal names

A reader who has followed the unit this far can read cartouches, and the best place to try is the most famous royal name of all. The last row of Figure 8 is the birth name of Tutankhamun, and it shows one more rule of the script.

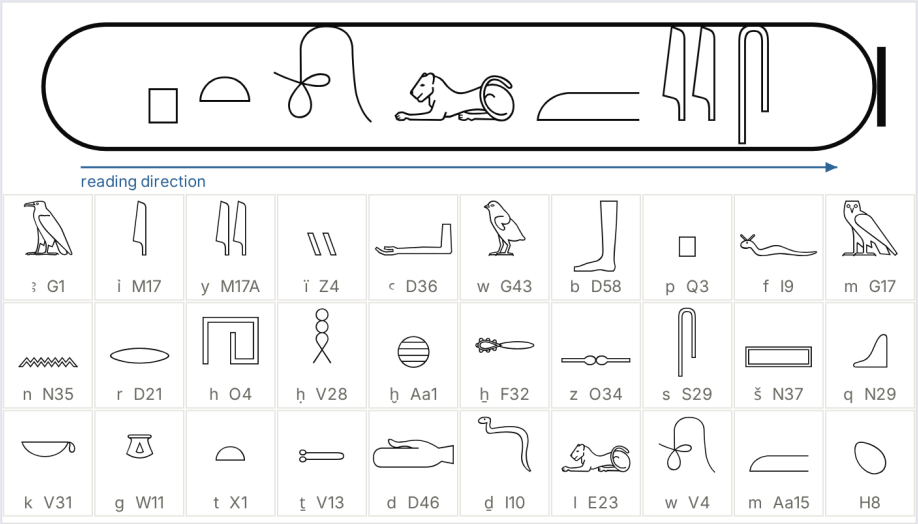
WORKED CASE Reading the cartouche of Tutankhamun

The cartouche holds ten signs. Signs 1 to 3 are the reed leaf *i*, the game board *mn* (Y5, a biliteral), and the water line *n*, its complement: *imn*, the god Amun. Signs 4 to 6 are the loaf *t*, the quail chick *w*, and the loaf *t*: *twt*, "image". Sign 7 is the *ꜥnḫ* of Section 2, here without complements, "living". Signs 8 to 10 are the crook *ḥqꜣ* "ruler", the pillar *iwnw*, the name of the city of Heliopolis, and the flowering sedge *šmꜥw*, "Upper Egypt": "ruler of the Heliopolis of Upper Egypt", an old title of Thebes.

Written, the name runs *imn-twt-ꜥnḫ*, with the god first. Spoken, it was Tut-ankh-Amun, "the living image of Amun", with the god last, and that is the order the Greek and the modern spellings follow. The scribes wrote the name of a god before the other words of a name or a title as a mark of respect, whatever the spoken order, and this practice is called **honorific transposition**. Unit 1 met it when writing the name in transliteration; here is the reason in the signs. The same rule explains why the sun disc stands first in Ramesses: there the god's name was also spoken first, so writing and speech agree.

The cartouche therefore reads *imn-twt-ꜥnḫ ḥqꜣ-iwnw-šmꜥw*, Tutankhamun, ruler of Southern Heliopolis. Objects from the first years of his reign carry the earlier form of the name, Tutankhaten, with the name of the Aten, the sun disc, in place of the signs of Amun, which Unit 8 explains.

INTERACTIVE The cartouche reader



Click the signs of the table to fill the cartouche, or load the name of Ptolemy or Cleopatra, and read the transliteration that the readout builds in the reading order. Switch the direction and watch the signs turn round, the knot of the cartouche change ends, and the first sign to be read move to the other side, while the transliteration stays the same.

Click the picture or this link to try it in the online version of this unit.

The names in cartouches are the easy part of the script, because they are short, their owners are known, and their signs are mostly uniliterals. Reading a sentence needs the grammar, which lies beyond this unit.

KEY POINTS

- Hieroglyphs are pictures that write a language. By the rebus principle a picture writes the consonants of its word, and that sound serves other words; the vowels are never written.
- Each sign in a word is a phonogram of one, two, or three consonants, a logogram marked by a stroke, or a determinative that classifies the word without being read. Phonetic complements repeat sounds that a bigger sign already carries.
- A line is read into the faces of its signs, square by square, from the top in columns; a cartouche encloses a royal name and follows the same rules.
- The decipherment rested on the Greek of the Rosetta Stone, on royal names in cartouches that fixed sign values across several names, and on Coptic, which gave the sounds of Egyptian words. Young found the first values; Champollion read the script.
- Hieratic is the cursive of papyrus from the first dynasties, Demotic the faster cursive of business from about 650 BC, and Coptic the Egyptian language in Greek letters. The last hieroglyphic inscription was carved at Philae on 24 August AD 394.
- In a royal name the god's name is written first, whatever the spoken order: *ỉmn-twt-ʿnḫ* is spoken Tutankhamun.

Solutions to the questions in the text: 1-A, 2-C, 3-B. The online version of this unit explains each answer.