Preserving information

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Abstract: The decipherment of linear B writing in 1952 by Michael Ventris has thrown light on a very interesting issue: in the second millennium B.C., the Greeks had a writing system, but the amount of information they put into writing was limited. Other civilisations, including the Celts, made the same choice. A choice was made between what you memorise and what you write down; the reasons for this choice could be political and religious in nature. In the course of history, there has been often a great resistance to writing, a resistance which in most cases arose out of a form of respect for the human memory, and a strong diffidence towards storing important information outside the human brain. This resistance is certainly connected with the status of sacred object that has often been bestowed on specific writings. It is interesting and curious to observe how the problem of preserving information outside of human memory has appeared again with the introduction of computers.

Key words: information science, memorisation, preserving information, writing

WHAT SHOULD BE PUT IN WRITING?

One of the major scientific breakthroughs of the twentieth century in the human sciences was the decipherment in 1952 by the Englishmen Michael Ventris and John Chadwick of what was called the "Minoan script" from Crete. It was perceived that there were in fact several scripts, and that the only one which transliterated texts comprehensible to us was the one classified under the name of "linear B". It transmits texts to us dating from the thirteenth century B.C., written in Greek.

Now, it very soon became inescapably evident that the material inscribed on the tablets was of a purely administrative nature. This brings us back to the very origins of writing: the earliest specimens to which we give that name are clay spheres from Mesopotamia, carrying inscriptions dealing with the management of flocks and herds. Thus, when people first thought of writing, it was because they needed it for their economic and administrative activities. In other words, the information that was to be stored by this means underwent a process of selection.

Nevertheless, within the "administrative" texts that thus became readable again after 32 centuries, we can discern in the Greek wording rhythmic formulae which are segments of verse of the "Homeric" type. Thus a list of "oarsmen proceeding to Pleuron" (Pylos, An 1) contains the item "e-re-ta, pe-re-u-ro-na-de, i-jo-te" (each sign in the graphic system used represents one syllable composed of consonant plus vowel, so it is a "syllabary"), which gives the rhythm υ υ – – – υυ – – (where υ represents a short syllable and – a long one). Metricians recognise there the ending of a dactylic hexameter; so we have a poetic form within an administrative text. This is not an isolated example.

What is more, the descriptions of objects, as presented in the Homeric poems on the one hand and the administrative inventories from Pylos on the other, show an analogy of sequence (the presence of a similar "algorithm"). To see this we need only compare the description of objects in the Ta series from Pylos with descriptions such as that of the armour of Agamemnon or the shield of Achilles in the Iliad.

So we get the impression that those who wrote, had in mind something that they did not put into writing, but which was similar in its form to what was later to be put into writing under the name of Homeric poems, and that we catch it as it were by stealth. At any rate, there is interpenetration between the world of the scribes and that of the narrator-composers of epics (the "bards").

"OUR ANCESTORS THE GAULS" AND THE ORAL TRADITION OF HOMER

The practice of the Gallic tribes, as described for us by Caesar, was to use Greek characters for their administrative records (Gallic Wars, 1.29), while at the same time their "druids" (wise men) refused to entrust to writing what they held essential: they memorised it (Gallic Wars, 6.14). Thus the Helvetians, a Gallic tribe, had set out on a trek in 58 B.C. and wanted to cross the bridge over the Rhone at Geneva, taking with them inventories of personnel and equipment written in Greek characters (Gallic Wars, 1.29) and motivated by political-religious considerations that they kept inside their heads and which therefore to this day remain mysterious to us. The Homeric poems, too, were entrusted to memory; they date from times preceding the advent of alphabetic writing in Greece. If we say, for example, "Ulysses" *for the name of the hero*, but "Odyssey" *for the title of the poem telling the tale of that specific hero* (and not "Odysses", *which would sound logical for the hero of "Odyssey"* or "Ulyssey", *which would be the expected form for the title of a poem about Ulysses*), it is because the name of that hero, conceived in a language that was not Greek, contained a sound that the Greeks did not use (the "apico-alveolar flap") and which they transliterated variously as "d" or "l". This tells us that the personage in question did not have a Greek name, that he was a figure taken over by the Greeks, but preceding them, and that his adventures were long preserved in memory before reaching them. Further, the Homeric poems were composed by a process that operates by combining pre-existing formulae (one cannot help thinking, mutatis mutandis, of what in music we call improvisation, in particular in jazz or the playing of a figured base). Those word sequences are memorised as a sort of "poetic diction" with the help of which narratives can be constructed; the antiquity of some of those formulae is demonstrable, particularly in certain cases where the Greek wording must be given back its "Mycenean" morphology if it is to be correctly scanned.

French too has vestiges of old formulae in stories transmitted orally (e.g. the well-known "tire la bobinette et la chevillette cherra" from the original of "Little Red Riding Hood"). These processes were first studied in connection with Slavic oral literatures, and it is the American scholar Milman Parry who must be credited with having turned them to account in the context of Homeric studies, specifically in a doctoral thesis defended in Paris before the French linguist E. Meillet (L'epithète traditionnelle dans Homère, Paris 1928). The most ancient and venerable works in our European literature were thus composed orally and transmitted for centuries in people's memories. The information stored in this way has been aptly defined as the "group oral encyclopaedia".

For indeed, these compositions were not intended solely for the pleasure of the listeners to whom they were recited, but were in a way "designs for living", providing models of behaviour, ethical lessons, and even algorithms for operations such as launching a boat or organising a feast. The "bard" or composer-narrator was consequently responsible not only for the memorisation of formulae and of narratives, but also for the processing of the information thus memorised. The Homeric poems show us in action bards who are asked to sing about this or that subject (see Books I and VIII of the Odyssey), and the Balkan guzlars observed by Milman Parry did the same, choosing both the subject itself and the appropriate length of the recital according to the time available. This responsibility both for memory and for the uses of memory carries a dual implication, religious and at the same time political.

In the religious sphere, the reference made by the Homeric poet to a "Muse" (and the Muses are the daughters of "Memory") conferred on him the awesome privilege of communicating a vision of the ordering of the world that would be invested with a sacred aura. Thus Herodotus, writing in the second half of the fifth century B.C., would be able to say that Homer and Hesiod had given the Greeks the information they possessed about the gods (2.53).

In the political sphere, the choice of information was to be conditioned by the interplay of rival forces. Thus the famous "catalogue of ships", in Book II of the Iliad, detailing which Greeks were in the field against Troy, underwent manipulation by cities anxious to have their names feature in it, rather like people who consider it an honour to have had ancestors among the crusaders. The same claim to antiquity and, therefore, to legitimacy of rule is implicit in another Homeric catalogue: that of the ghosts of women from former times whom Ulysses meets in Book XI of the Odyssey: the loves of those fair mortals with gods served in particular to mark the starting points of genealogies that proved royal descent.

OPPONENTS OF WRITING

Given the way memory was exercised, it is understandable that the intrusion of writing, specifically a means for committing information to an object external to human memory, should have called forth objections. While the preservation of information might thereby be facilitated, the capacity for memorisation of the human individual would be impaired and flexibility in the exploitation of the information would suffer. For us, Plato is the chief objector to committing things to writing. There must have been many others before him, considering the polemical tone often assumed by

the first Greek prose writers and their critical view of the order conserved in human memory.

Two passages from Plato are important in this context. First there is the account (Phaedrus 274c1-275b2) of how the Egyptian king Thamus refused the gift of writing: the god Theuth (sacred name of the ibis) has given human beings arithmetic, geometry, astronomy and various games, and finally offers them writing, presented by the god as "the elixir of knowledge and memory". After due thought, Thamus refuses, saying: "... this invention will produce forgetfulness in the minds of those who learn to use it, because they will not practise their memory. Their trust in writing, produced by external characters which are no part of themselves, will discourage the use of their own memory within them. You have invented an elixir not of memory but of reminding; and you offer your pupils the appearance of wisdom, not true wisdom ..." (trans. Harold Fowler). Then there is a famous passage in his seventh letter (344c) in which Plato argues that committing it to writing deprives knowledge of the necessary dynamism of reflection: "... after much effort, as names, definitions, sights, and other data of sense are brought into contact and friction one with another, in the course of scrutiny and kindly testing by men who proceed by question and answer without ill will, with a sudden flash there shines forth understanding of every problem, and an intelligence whose efforts reach the furthest limits of human powers. Therefore every man of worth, when dealing with matters of worth, will be far from ... committing them to writing." (trans. J. Harward).

A slight digression on this point. The position taken here by Plato perhaps reflects, apart from his political wrangles with the princes of Syracuse, an aspect of the Greek language that Goethe put his finger on when he contrasted Greek with Latin: he saw Latin as a language designed to operate through nouns; and nouns present the world in a settled, as it were docketed form. Greek works preferably through its very comprehensive system of participles; and participles express a moving, evolving reality. Writing can be seen from that viewpoint as deadening in that it fixes information.

Of course, the alphabet was not invented by the Greeks to put into writing the Homeric epics as vehicles of a people's culture. The fact that they borrowed the names of the letters from the Phoenicians, who used a consonantal notation system from which the Greeks derived the present notion of the alphabet, points rather to trade rivalry as the motive force. The fact remains that it is to the same period (between the eighth and sixth centuries B.C.) that we assign the first inscriptions written with the alphabet and the commitment to writing of the Iliad and the Odyssey.

The perverse effects of putting in writing matter with a political or religious purport can no longer be gauged by these examples. To do that, we

must look to the Africanists. In a study published in 1952[1], Laura Bohannan describes how the British administrators of Nigeria settled differences that arose among the Tiv population by referring to genealogies that were transmitted orally and to which the Tiv appealed to establish their rights (just like the catalogue of women from former times in the Odyssey). To stabilise the situation, the administrators had these genealogies set down in writing. A generation later, to the great surprise of the English magistrates, the Tiv, still clinging to the oral tradition, refused to recognise the validity of the written version. In the event the collective memory had continued gradually rearranging the facts in response to changing circumstances; the written memory had accordingly become null and void.

While the perverse effect was observable, a beneficial effect was nonetheless kept in view. It was precisely at the end of the seventh and beginning of the sixth century B.C. that the Athenian statesman Solon put the laws in writing and displayed them to the public. Such direct access to the legislation constituted a guarantee of equality for the citizens. Solon was to be admitted to the company of the "Seven Sages", and it was another of those sages, Phidon of Argos, who fixed the value of money. The objective was the same: money guarantees equality for all in the conditions for acquiring material goods (witness the reserved-access shops which are a means of getting around that equality in favour of the least disadvantaged), and writing displayed for all to see guarantees equality of treatment, or at least the desire felt for it.

Note, all the same, that a certain prejudice persisted against committing to writing what could be learnt by heart. That is why we have no written works at all either by Socrates or by Epictetus, and why, in another part of the world, we narrowly missed having nothing by Lao Tzu[2].

AN IRREVERSIBLE STEP; CONFLICTING FEELINGS

Nevertheless, like it or not, whether or not one had reservations, a new chapter in the history of our species opened when it became possible to transfer information from our memories into objects, i.e. to store information outside our organisms.

[1] Cited by Marcel Détienne, *L'invention de la mythologie*, Paris 1981, pp. 78-79.

[2] If we are to believe the anecdote handed down by tradition, cf. Lao Tzu. *Tao Te King, le livre du Tao et de sa vertu*, new translation followed by a commentary on the teachings of Lao Tzu, Jean Herbert and Lizelle Raymond (edd.), Lyon, 1951, p. 8.

Litterae, "letters", still served in Cicero's time to designate the entire corpus of knowledge (incidentally, that is the original of the French "*Faculté des lettres*", from which other university faculties gradually became separated, just as in German the concept of "*philosophische Fakultät*" is based on a Greek view of philosophy as embracing the whole range of knowledge). Hence to inscribe letters was to preserve knowledge.

Once the machinery was in motion, attitudes towards resorting to the device would vary widely according to whether or not this means of storage was seen as partaking of the sacred or as a weapon of the secularly minded.

In his magnificent treatise on Chinese hieroglyphs, Jean-François Billeter tells us that writing does not have the same sense for the Chinese as for us[3]. In the preservation of information, hieroglyphs go further than letters: through their actual patterns they convey a comprehensive vision of the world as well as, by their juxtaposition, transmitting textual messages. This perhaps explains the contempt displayed by scholarly Chinese for the alphabet of the Koreans.

The Egyptians seem in fact to have been the first to be able to choose between an alphabet and a hieroglyphic system[4]. They deliberately chose the system that kept writing away from the masses and reserved its use for those able to grasp the vision of the world implicit in the signs themselves. At that price, storing information outside the human organism was perhaps perceived as politically (or religiously, which may come down to the same thing) less risky.

Conversely, we see the Greek alphabet as having been designed from the start to be a democratic, secular instrument, altogether in line with its commercial, non-aristocratic origins. Alongside Solon and his putting into writing of the laws for public display, we may cite the early Ionian "logographers", such as Hecataeus of Miletus, who turned out prose as a new product made possible by writing (in oral communication it is verse rhythm that serves as the preservative agent); and those logographers did not miss the chance of using this new device to criticise the lore transmitted through oral culture, such as mythical narratives and the genealogies of the characters. Here, the preservation of information by writing is the end result of a screening operation whose secular dimension is immediately evident. It is to some degree true that even the putting into writing of texts transmitted orally like the Homeric epics exposes them to critical scrutiny: they become accessible to all and their interpretation is no longer reserved for a professional caste. It is doubtless no coincidence that it was also the sixth

[3] Jean-François Billeter, *L'art chinois de l'écriture*, Geneva 1989.

[4] Giovanni Garbini, *The question of the alphabet*, in the volume containing contributions by various authors: *The Phoenicians*, Venice 1988, p. 89.

century B.C. which, with Theagenes of Reggio and Pherecydes of Syros, saw the first "allegorical" interpretations designed to defend the Homeric epics against the criticisms levelled at them.

Nevertheless, even the alphabet underwent elevation to sacred status, evidenced firstly in the fact that the order of the letters remained immutable. Where the Sanskrit grammarians had long since arranged the syllabograms representing their language in a sequence dictated by pronunciation, beginning at the base of the throat and finishing at the lips (from the back to the front of the human phonatory apparatus), the users of the Phoenician system out of which the Greeks made the "alphabet" (from the names of the first two letters) never dared tamper with the sequence of those signs. That sequence bears no relation to their pronunciation.

It was in 1978 that a specialist in oriental astronomy, Alessandro Bausani, proved that our alphabet is in origin a calendar[5] in which the letters "aleph" (1), "tet" (9), "ayin" (16) and "tau" (22) indicate respectively the autumn equinox, the winter solstice, the spring equinox and the summer solstice. Such an explanation presupposes, according to Bausani, a situation where the autumn full moon is close to the Pleiades (as was the case in about 1600 B.C., when the first sequences of signs that were to become the "alphabet" appeared) and a region where summer was a hostile season. The absence of signs between the summer solstice and the autumn equinox indicate absence of activity at that time of year: the letters symbolise the passage of time in the sequence of labours and religious festivals. Thus it seems that our alphabet too is sacred in origin and constitutes a sort of algorithm.

With that knowledge, it is less surprising to find in *Revelation* (1.8, 21.6, 22.13) the famous sentence, "I am the Alpha and the Omega" (i.e. the first and last letters, for the characters added to the Phoenician system displaced "tau" from its position as final letter): the divine figure expressing Himself in those terms is indicating His presence at the beginning and end of time simultaneously, and that pronouncement is based on a conception of alphabetical writing as sacred in itself.

This conception of alphabetical writing as sacred was already implicit in the fact that the letters of the alphabet are presented in acrostic form in the psalms of the "First Testament" (formerly called "Old Testament": 111, 112, 119, 145) and in the *Lamentations of Jeremiah*. After the famous passage in *Revelation*, Christian poems were to use the alphabet in acrostics (there are some in the *Codex des Visions* of the Bodmeriana Library at Cologny, Geneva, published in 1999). Origen even used the Greek name of the letters ("elements") to designate *the* sacred text, the Bible (Migne PG 13, col. 608).

[5] *Ibid*, p. 102.

Be it noted that we too in referring to it, whether or not we are believers, continue to say simply "the scriptures".

It was therefore with a range of nuances from the most sacred to the most profane that writing was perceived as a means of preserving information outside our memories.

THE NEXT STAGE IN INFORMATION SCIENCE

In conclusion, let us turn briefly to modern information science. In computer terminology, "memory" means capacity to store information in a new form of writing (even though, for most of us, that writing remains directly dependent on the invention of the alphabet). The objections we have seen raised, here and there, to the introduction of data-processing techniques are amusingly reminiscent of the resistance encountered by the introduction of writing, and that is of course why I have dwelt somewhat upon that episode in the cultural history of humanity. One might go so far as to say, without excessive irony, that feelings for the sacred and the profane are not always lacking in those who practice data processing in any capacity whatsoever: I am reminded of the short story by Isaac Asimov entitled *The last question*, his own favourite work, in which God Himself turns out, in the last analysis, to be a computer.

But there is certainly a major difference: memory in this context is quite distinct from its exploitation. By means of exploitation programs, of software whose capacity sometimes far exceeds our own, we have learnt to duplicate and extend what the synapses do in our brains. Thus, while the challenge is today, as it was in the transition to writing, to project outside ourselves powers that are within us, the objective will henceforth be far more visibly to achieve thereby a multiplication of the possibilities thus offered. The risk is probably worth taking, even if the exercise of our memories must thereby suffer.

For that matter the opposition, on which Plato takes his stand, between the memory within us and a memory entrusted to an external object might come to be considered outdated in the light of studies bringing together information science and biology, on the lines of those being conducted at the EPFL by Professor Daniel Mangue, but for the moment that is in the realm of speculation.

(Translation by J. Fraser)

BIOGRAPHY

André Hurst is professor of Greek and currently rector of the University of Geneva, Switzerland. His field of research and teaching includes Mycenaean Greek, ancient epics (Homeric poems, Hellenistic poetry, early Christian Greek poetry), ancient theater and papyrology.

André Hurst has studied in Geneva, Rome and München. He was visiting professor at McGill University (Montréal, Canada), Université de Lausanne (Switzerland), Universitatea Babes-Bolyai (Cluj-Napoca, Romania), Ecole Normale Supérieure, rue d'Ulm (Paris, France), and a member of the Senior common room of St John's College, Oxford. He has been chairman of the Board of Trustees of Conservatory of Geneva several times. He was dean of the Faculté des lettres at the University of Geneva from 1986 to 1992 and he presided the commission of postgraduate studies of the faculties of Arts of the French speaking Swiss universities until 2003.