Chapter 1
Writing and its emergence

Civilization cannot exist without spoken language, but it can without written communication. The Greek poetry of Homer was at first transmitted orally, stored in the memory, as were the Vedas, the Sanskrit hymns of the ancient Hindus, which were unwritten for centuries. The South American empire of the Incas managed its administration without writing. Yet eventually, almost every complex society – ancient and modern – has required a script or scripts. Writing, though not obligatory, is a defining marker of civilization. Without writing, there can be no accumulation of knowledge, no historical record, no science (though simple technology may exist), and of course no books, newspapers, emails, or World Wide Web.

The creation of writing in Mesopotamia (present-day Iraq) and Egypt in the late 4th millennium BC permitted the command and seal of a ruler like the Babylonian Hammurabi, the Roman Julius Caesar, or the Mongol Kublai Khan, to extend far beyond his sight and voice and even to survive his death. If the Rosetta Stone had never been inscribed, for example, the world would be virtually unaware of the nondescript Graeco-Egyptian king Ptolemy V Epiphanes, whose priests promulgated his decree upon the Rosetta Stone in 196 BC written in three scripts: sacred hieroglyphic, administrative demotic, and Greek alphabetic.

Writing and literacy are generally seen as forces for good. All modern parents want their children to be able to read and write. But there is a negative side to the spread of writing that is present throughout its more than 5,000-year history, if somewhat less obvious. In the 5th century BC, the Greek philosopher Socrates (who famously never published a word) pinpointed our ambivalence towards 'visible speech' in his story of the Egyptian god Thoth, the mythical inventor of writing. Thoth came to see the king seeking royal blessing on his enlightening invention. But instead of praising it, the king told Thoth:

> You have invented an elixir not of memory, but of reminding; and you offer your pupils the appearance of wisdom, not true wisdom, for they will read many things without instruction and will therefore seem to know many things, when they are for the most part ignorant.

In a 21st-century world saturated with written information and surrounded by information technologies of astonishing speed, convenience, and power, these words of Socrates recorded by his disciple Plato have a distinctly contemporary ring.

This book introduces the origins of writing; the routes via which writing spread and developed into hundreds of scripts for some of the world's thousands of spoken languages; the ways in which different writing systems convey meaning through phonetic signs for consonants, vowels, and syllables, combined with logograms – non-phonetic signs standing for words (for instance, @, $, &, =, ?); the tools and materials that scribes and others have used for writing; the purposes to which writing has been put by societies over five millennia; and the extinction and decipherment of scripts.

Naturally, not every script can be included: a recent academic reference book, *The World's Writing Systems*, runs to almost a thousand substantial pages. However, every significant script is mentioned. For all the enormous variety of scripts, past and

present, it turns out that extinct ancient scripts such as Egyptian hieroglyphs, Mesopotamian cuneiform, and Mayan glyphs have much in common in both their structure and function with our modern scripts and our specialized communication systems – whether these be alphabets, Chinese characters, mobile phone text messages, or airport signage. The signs of these scripts and systems may differ vastly from each other, but the linguistic principles behind the signs are similar. The ancient scripts are not dead letters, not just esoteric curiosities. Fundamentally, the way that writers write at the start of the 3rd millennium AD is not different from the way that the ancient Egyptians and Mesopotamians wrote.

Proto-writing and full writing

In a cave at Peche Merle, in Lot, in southern France, there is a boulder with some mysterious signs on it: a stencilled hand – with four splayed fingers and a thumb clearly visible – in red dye, and next to it a random pattern of some eleven red dots. What makes these signs significant is that they are probably 20,000 years old, belonging to the last Ice Age, like many other graffiti from southern France, which often include animal images with signs written over or around them. An example from a different cave shows an engraved figure of a horse, over-engraved with a series of 'P' signs (one of them reversed); in an adjoining cave a horse figure is surrounded by more than 80 'P' signs, many of which clearly were made with different tools.

Are the hand-with-dots and the 'P' signs to be regarded as writing? It is tempting to imagine that the former signs are the palaeolithic equivalent of 'I was here, with my animals' (one dot per animal), and that the latter were made by an Ice Age individual as part of some continuing act of worship. No one knows for sure. Undoubtedly, though, the signs were meant to communicate something.

1. This engraved horse, over-engraved with a series of signs, from the cave Les Trois Frères in southern France, dates from the last Ice Age. It is one of many such examples of proto-writing

We can call them 'proto-writing': permanent visible marks capable of partial/specialized communication. Some scholars limit proto-writing to the earliest forms of writing, but in this book the term is applied much more widely. Thus there are endless varieties of proto-writing. It includes prehistoric petroglyphs from around the world, Pictish symbol stones from Scotland, Amerindian pictograms, notched and inscribed wooden tally sticks (used until 1834 by the British Treasury), and the fascinating knotted-rope *quipus* used to keep track of the movement of goods in the Inca empire. Equally valid as proto-writing are contemporary sign systems like international transportation symbols, computer icons, electronic circuit diagrams, mathematical notation, and the staff notation of musical scores.

In other words, the 'proto' prefix refers here not to historical but to functional development. Although proto-writing long preceded the emergence of 'full writing', such as the English alphabet or the Chinese characters, in time, it will always exist alongside full writing. Proto-writing did not disappear as a result of the appearance of full writing – swept away as primitive in some

supposed evolutionary progress towards our current superior form of writing – but has continued to be used for specialized purposes. Scientific journals, for instance, contain a mixture of full writing (text generally in alphabetic script) and proto-writing (mathematics and visual diagrams). Theoretically, the mathematics could be expressed in words, as early natural philosophers like Newton often did, but the converse does not hold: the words could not be written in mathematical symbols.

Full writing has been concisely defined as a 'system of graphic symbols that can be used to convey any and all thought' by John DeFrancis, a distinguished American student of Chinese, in his book *Visible Speech: The Diverse Oneness of Writing Systems*. Not all scholars of writing agree with this. A small minority do not draw a distinction between proto-writing and full writing; they regard both of these as 'writing', though capable of differing degrees of expressiveness. Others take issue with the idea that all thought can be expressed in spoken language, and would prefer 'any and all *language*' in the above definition. The most thought-provoking moments in cinema, for example, are often wordless; and mathematicians apparently think more in visual images than in words. Nevertheless, almost all thoughts can be verbalized with sufficient training. 'To know how to write well is to know how to think well', said the mathematician, physicist, and philosopher Blaise Pascal. And so the DeFrancis definition is useful, both in itself and in the way that it implicitly distinguishes full writing from proto-writing.

Clay 'tokens'

One kind of proto-writing that has attracted much attention – because it may provide evidence for the origin of full writing – is the so-called clay 'token'. Archaeological excavations in the Middle East over the past century or so have yielded, besides clay tablets, large numbers of small, unimpressive clay objects. Excavators had

no idea what they were, and generally discarded them as worthless. According to the stratigraphy of their excavations, the objects date from 8000 BC – the beginnings of agriculture – to as late as 1500 BC, although the number of finds dated after 3000 BC tails off. The earlier objects are undecorated and geometrically shaped – spheres, cones, and so on, while the later ones are often incised and shaped in more complex ways.

No one can be certain of their function. The most probable explanation, widely accepted, is that they were units in accountancy. Different shapes could have been used to count different entities, such as a sheep from a flock, or a specified measure of a certain product, such as a bushel of grain. The number and variety of shapes could have been extended so that one object of a particular shape could stand for, say, ten sheep or 100 sheep, or black sheep as opposed to white ones. This would have permitted large numbers and amounts to be manipulated arithmetically with comparatively small numbers of clay objects. It would also explain the noticeable trend towards greater complexity of object over time, as the ancient economies ramified.

On these assumptions, the objects are generally termed 'tokens', because they are thought to have represented concepts and quantities. According to one theory, this token system was pictographic writing in embryo; hence the decline in numbers of tokens with the growth of writing on clay tablets after 3000 BC during the 3rd millennium. The substitution of the three-dimensional tokens by two-dimensional symbols on clay tablets was supposedly a first step towards writing. However, although this theory has been much discussed, it is not widely accepted.

To understand why, we need to look at the most interesting among the finds of clay tokens. These show the tokens enclosed in a clay envelope, generally shaped as a hollow ball and known as a 'bulla' (Latin for 'bubble'). Some 80 bullae are known to exist with the tokens intact. Shake the bulla, and the tokens rattle inside it; their

outlines are visible using X-rays. The sealed outer surface may carry impressions in the clay, which sometimes correspond to the tokens inside.

The purpose of a bulla was most probably to guarantee the accuracy and authenticity of stored tokens in commercial transactions. Tokens kept on a string or in a bag could be tampered with; fraud was much less easy where the tokens were sealed away. If goods were being despatched, a sealed bulla might have acted as a bill of lading. In the event of a dispute, the bulla could be broken open and the contents checked against the merchandise.

By marking the outside of the clay, it would have been possible to check the contents without having to break the bulla, though of course such impressions would not have been as secure from tampering. But the evidence here is ambiguous. One would expect the number of exterior impressions to match the number of tokens. In some cases this is so, but not always. One might also expect a match between the shapes of the impressions and the shapes of the tokens. (Presumably, after the bulla was sealed, the impressions would be made with other tokens exactly like those hidden inside.) In fact, the correlation is patchy.

Some scholars, led by Denise Schmandt-Besserat, think that these exterior marks on bullae were a step towards the marking of clay tablets with more complex signs, and the consequent emergence of writing. While their theory is reasonable, it seems over-complicated. Why should a sign scratched in a tablet be considered a more advanced idea than an impression on a clay ball or, for that matter, than a clay token itself? If anything, the modelling of an engraved token seems to be more advanced than the scratching of a sign. Compare the invention of coins, which postdated scratch marks and notches on a tally stick. (There are notched Ice Age bones that may be lunar calendars.) Furthermore, tokens and bullae continued to be made long after the emergence of cuneiform writing. Rather than giving rise to the idea of full writing, as

suggested, tokens and bullae probably acted as supplements to writing, like tallies. In other words, they did not precede writing, but rather accompanied its development.

Pictograms

So how did writing begin? Until the Enlightenment in the 18th century, the favoured explanation was divine invention, as in the story of Thoth told by Socrates. Today many, probably most, scholars accept that the earliest writing evolved from accountancy – not via the clay tokens but nonetheless as a result of commercial requirements.

The earliest writings from Mesopotamia, fired clay tablets dating from around 3300 BC, are all accounting records, while the earliest evidence for writing in Egypt, dating from around 3200 BC, is to be found in the symbols on tags made of bone and ivory used for the identification and counting of grave goods. (Neither date is certain, and some Egyptologists claim a slightly earlier date for Egyptian writing.) The earliest writing from Europe, the Linear A and Linear B clay tablets from Crete/mainland Greece belonging to the mid-2nd millennium BC, are account records. Although it is puzzling that in China, India, and Meso-America accountancy is little in evidence in the earliest writing, the reason may simply be that such accounts have not survived. Commercial record keeping in these early civilizations may have been on perishable materials like bamboo, bark, or animal skin. Such materials decayed and disappeared, unlike those in Mesopotamia, Egypt, and Crete. Even clay tablets in many cases have endured only because they were accidentally baked and hardened during the incineration of palace archives.

In other words, some time in the late 4th millennium BC, in the cities of Sumer in Mesopotamia – the 'cradle of civilization' between the rivers Tigris and Euphrates – an expanding economy compelled the creation of writing. The complexity of trade and

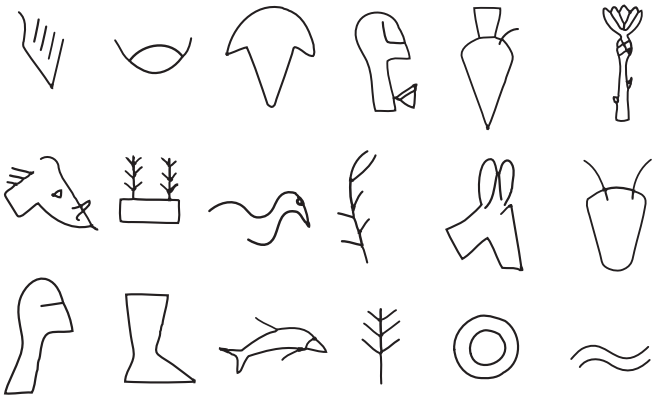
administration reached a point where it outstripped the power of memory among the governing elite. To record transactions in a dependable, permanent form became essential to government and commerce. Administrators and merchants could then say the Sumerian equivalent of 'I shall put this in writing' and 'Can I have this in writing?'

Some scholars believe that a conscious search for a solution to this problem by an unknown Sumerian individual in the city of Uruk (biblical Erech), circa 3300 BC, produced writing. Others posit that writing was the work of a group, presumably of clever administrators and merchants. Still others think it was not an invention at all, but an accidental discovery. Many regard it as the result of evolution over a long period, rather than a flash of inspiration. These are all reasonable hypotheses, given the severely limited evidence, and we shall probably never know which of them is actually correct.

What is virtually certain, though, is that the first written symbols began life as pictures. Many of the earliest signs from Mesopotamia, Egypt, and China are easily recognizable pictograms. They depict creatures such as fish, birds, and pigs, plants such as barley and date-palms, parts of the body such as hands and heads, objects like baskets and pots, and natural scenes like the sun, moon, mountains, and rivers.

Some of the early pictograms represent abstract concepts, too. Thus a drawing of a leg and foot may stand not only for 'leg and foot' but also for the concept of 'walk' or 'stand', and a head with a bowl near its mouth may stand for 'eat'. In such cases, the symbolism is universally comprehensible, yet this is not generally true of pictograms.

In the first place, a picture can become so stylized and simplified that it is no longer recognizable as a pictogram. This change happened during the development of Mesopotamian pictograms



2. These pictograms from Mesopotamia appear on Sumerian clay tablets, dating from c. 3000 BC. They have the following meanings:
***top row*: hand/day/cow/eat/pot/date-palm**
***middle row*: pig/orchard/bird/reed/donkey/ox**
***bottom row*: head/walk, stand/fish/barley/well/water**

into certain signs of the cuneiform script and the later development of Chinese pictograms into elements of the character script. Although Egyptian hieroglyphic resisted the trend towards abstraction and remained clearly pictographic, it gave birth to a second, more abstract, administrative script known as hieratic, and much later to a third administrative script, demotic (written on the Rosetta Stone), where any resemblance to hieroglyphic is difficult to detect.

Second, at what point on a scale of increasing abstraction and association of ideas does the meaning of a pictogram fall? A standing male stick figure could mean, for example, anything from one individual to the totality of mankind; it could also symbolize 'stand', 'wait', 'alone', 'lonely', or indeed 'Men's WC'. Similarly, the Sumerian symbol for 'barley' could just as well mean any other kind of grain-producing plant, or indeed any plant. The situation with pictograms is somewhat similar to that of children learning to

talk. Having learnt that the family dog is called 'dog', they may over-extend the word to other animals they see, such as cats – or they may use the word too narrowly, applying it only to one particular dog, their family dog.

The very earliest Sumerian tablets from Uruk consist of pictograms or quasi-pictograms and numerals. They concern calculations. Although we cannot be sure of the tablets' meaning in every detail, we can sometimes follow a calculation, as described in the seminal study *Archaic Bookkeeping: Writing and Techniques of Economic Administration in the Ancient Near East* written by a multidisciplinary team of scholars, Hans Nissen, Peter Damerow, and Robert Englund. (The title may not sound very inviting, but in fact the book can be as intellectually intriguing as a detective story.)

The Sumerian numerals were impressed in the clay tablet in ways that remained the same for many centuries, as the cuneiform script developed during the 3rd millennium BC. The round end of a reed stylus was either pressed vertically into the soft clay to make a circular hole, or it was pressed at an angle to make a fingernail-shaped depression – or a combination of both impressions, superimposed, was used to express a larger numeral. It is possible that the particular shapes created by the stylus developed out of the impressions made in the clay bullae. But it is equally possible that they were developed specially for use on the clay tablets.

The tablet shown on page 12 records a transaction in barley. The pictogram for barley appears twice, very plainly. The numerals at the top record the quantity of barley. The three fingernail-shaped depressions on the far left, each with a circular hole in it, write the biggest unit, corresponding to 43,200 litres, hence they total three times 43,200, which equals 129,600 litres. The grand total of all twelve numerals represents about 135,000 litres. Immediately beneath them on the left are the signs for the accounting period,

3. This early cuneiform clay tablet, from ancient Uruk in today's Iraq, dates from the late 4th millennium BC. It records a transaction involving barley. See the text for a fuller explanation

4. These bone tags from tomb U-j at Abydos, dating from c. 3200 BC, are the oldest group of inscribed artefacts so far known in Egypt. Some scholars believe that the pictograms on the tags were precursors of the later hieroglyphic writing system, which appeared some time between 3100 and 3000 BC

37 months; if you look carefully, you can see three circular holes standing for 30 and 7 small depressions enclosed in the sign for 'month'. Immediately beneath this 'month' sign are two signs for the name of the responsible official or the name of an institution/office – a sort of Sumerian signature. On the basis of the two signs' resemblance to later cuneiform signs of known phonetic value, the official's name may have been 'Kushim'. Some other signs in the bottom right-hand corner are less clear in meaning, but may refer to the function of the document and the use of the barley. Given the very large amount of barley and the long accounting period (some three years), the tablet appears to be a summary of a 'balance sheet'.

In Egypt, the oldest group of inscribed artefacts – discovered only in the late 1980s – comes from a royal tomb known as U-j at Abydos, predating the dynastic period that began in 3100 BC. Some are ceramic jars, more than a hundred of them, bearing large single or paired signs on their walls. However the second type of artefact, the more intriguing of the two, consists of nearly 200 small bone and ivory tags just over one-and-a-quarter centimetres in height on average, drilled in one corner, which look as if they were once attached to bales of cloth or other valuable grave goods that have vanished with tomb robbers. Inscribed on the tags are numerals – in groups of up to twelve single digits, plus the sign for 100 and for 100 + 1 – and pictographic signs, although puzzlingly the numerals and the pictograms hardly occur together on the same tag. At least some of the pictograms, but certainly not the majority, strongly resemble later hieroglyphic signs, in particular some birds, a stretch of water, and possibly a cobra.

According to the tags' excavator, the signs are precursors of the hieroglyphs. They show the existence of a writing system that would give rise to the familiar hieroglyphs within a few hundred years, moreover a system inspired by economics, as with the inventories written on the Uruk clay tablets. However this

conclusion is doubtful. While the element of accountancy in the tags is undeniable, the existence of a writing system is unproven, and the connection with the hieroglyphs is speculative. At present, there is simply no way to be sure of the precise usage and meaning of this limited repertoire of primitive signs, or of how they may have been connected with the later hieroglyphs; and there is nothing in the signs that requires a phonetic reading based on the Egyptian language. Unless considerably more material is discovered by archaeologists, there is unlikely to be a consensus about the significance of the U-j inscriptions, apart from the fact that they predate all other writing found in Egypt.

The origin of full writing

The writing on the Uruk tablet and the U-j bone tags is not full writing, but rather a developed form of proto-writing. So far as we know, none of its signs expresses the phonetic values of the Sumerian or Egyptian language spoken in the late 4th millennium, unlike the signs of the cuneiform and hieroglyphic scripts in the subsequent millennium – with the possible exception of the signs that may read 'Kushim'. The numerals and the pictograms, such as those showing barley and birds, may be read in any language, not only Sumerian or Egyptian.

Some time after the creation of these very early pieces of writing and before the appearance of the cuneiform and hieroglyphic scripts, which has been dated to 3100–3000 BC, there was a breakthrough into full writing. The concept of the rebus was invented (we do not know how). It is the rebus principle that permits words to be written in terms of their constituent parts that cannot be depicted pictographically. The rebus – which comes from a Latin word meaning 'by things' – permits the parts of any spoken word, including abstract concepts, to be written in signs. With the rebus principle, sounds could be made visible in a systematic way, and abstract concepts symbolized.

Rebuses are familiar today from puzzle-picture writing, and also to some extent from electronic text messaging. For instance, Lewis Carroll, author of *Alice's Adventures in Wonderland*, liked to write rebus letters to child friends. One of his puzzle-picture letters has little pictures of a deer for 'dear', an eye for 'I', and a hand for 'and'. My surname, Robinson, could be written as a rebus using a picture of a robin followed by a picture of the sun; and my first name, Andrew, might (at a stretch) be written as a picture of a hand, standing for 'and', followed by a pencil making a drawing, standing for 'drew'. Still staying with English examples, a picture of a bee with a picture of a tray might stand for 'betray', while a picture of a bee with a figure 4 might represent 'before'.

Ancient rebuses include a Sumerian accounting tablet from about 3000 BC. The symbol in its top left-hand corner is a pictogram representing the Sumerian word for 'reed', pronounced *gi*. Yet on this tablet the sign does not mean 'reed' but is a rebus for 'reimburse', an abstract concept also pronounced *gi* in Sumerian. 'Reed' and 'reimburse' are homophonous – they have the same sound – in Sumerian, like 'son' and 'sun' in English. In Egyptian hieroglyphs, which are full of rebuses, the 'sun' pictogram, ⊙, pronounced *r(a)* or *r(e),* stands for both the sun god Ra and the first symbol in the hieroglyphic spelling of the pharaoh known as Ramesses (in his ancient Greek spelling). There is even a statue of Ramesses II in which the entire image is a rebus. It makes visual sense as a boy with a solar disc on his head and in his hand a reed plant, the heraldic symbol of Upper Egypt. But it can also be read phonetically as three hieroglyphs – sun, child, and reed – pronounced *r(a)*, *ms* and *sw*: the Egyptian spelling of Ramesses.

There is obviously more to full writing than pictograms and rebuses. But it was this combination of ideas, whether invented, stumbled upon, or gradually developed in the late 4th millennium BC, which allowed writing systems to begin to convey 'any and all thought' that was expressible in spoken words.