The practice of representing data directly, without the intermediary of language, goes back to the dawn of human history. Ideas can be transmitted visually by various means: by objects, by abstract and/or geometrical patterns and designs, or by pictorial representations of human beings, animals, plants and objects. In many cases a combination of two or all three elements is used to store a particular piece of information.

Objects can communicate warnings (grass and leaves scattered over a side-track to indicate that it is best avoided); they can indicate direction (a branch stuck into the ground pointing to the direction where a person has gone or should go); they can be used to recall an event, a place or a person (stones piled over a grave). Herodotus tells the story of a Scythian ruler who sent the gift of a bird, a mouse, a frog and seven arrows to Darius, which were variously interpreted to the Persian king as either an offer of surrender (equating the mouse with the Scythians, the bird with their horses and the arrows with their arms which they were about to surrender) or a declaration of defiance (the Persians would be killed by the arrows if they did not fly away like birds, hide in the earth like mice and leap into the water like frogs).

By modifying or decorating objects (painting, carving, engraving) or by artificially creating (decorated) objects, an already remarkably high level of information storage can be reached. There are for example the message sticks of the Australian aborigines (fig. 1)—rounded wooden batons, sticks or tablets incised with marks, grooves or nicks. Often the incisions were made in the presence of the actual messenger and the importance of each mark was carefully explained to him. Message sticks were an essential part of aboriginal culture, linking together widely-scattered members of the community; and carrying such a stick would in many cases ensure safe conduct through hostile territory.

The Moche, a pre-Inca people from Peru (see p. 78) used beans marked with dots, parallel lines, and/or a combination of both, for sending messages. Leather pouches filled with such beans have been found in Moche graves. They also feature quite prominently in scenes painted on pottery vessels, where runners are frequently depicted carrying them with exuberant determination (fig. 2).

The wampum belts of the Iroquois of North America (fig. 3) combined the use of patterns and colours for the transmission of messages; they were also used in ritual, ceremonial, as currency, and for personal decoration. Wampum belts were woven on a bow-loom in a manner analogous to other forms of weaving, and decorated with cylindrical beads made of sea-shells, winkle,whelks and clams. Most belts included designs in one colour on a background of another; no further colours were used. Dark colours signified solemnity and gravity, standing for danger, hostility, sadness and death. White stood for happiness, and red for war. More elaborate belts interwoven with coloured symbols could be used as declarations of war (a black belt with the sign of a tomahawk in red, for example), or as peace treaties (two dark hands on a white background), and so on.

Linguistic elements can already play a part, either by an association of ideas or an association of sound. Many of the decorations found on Asante houses, objects or utensils represent definite ideas expressed linguistically in the form of proverbs. For example, the
image (carved on a pipe) of a bird turning its head backwards can express the sentiment ‘a person should not hesitate to turn back to undo past mistakes’ (fig. 4), and that of a crocodile grasping a mudfish in its mouth can stand for proverbs such as ‘only a bad crocodile eats a creature which shares the same hole in the river bed’ or ‘if the mudfish gets anything it will ultimately go to the crocodile’ (MDD, p. 48).

An even more sophisticated way of conveying messages through objects is known to the Yoruba of Nigeria, who use cowrie shells for this purpose. One cowrie shell denotes ‘defiance and failure’, two placed together ‘relationship and meeting’, three placed apart ‘separation and hostility’. Six cowrie shells mean ‘attracted’ because in the Yoruba language the word ojo means both ‘six’ and ‘attracted’. A string of six cowrie shells sent to a person of the opposite sex means ‘I am attracted to you’, and a string of eight shells returned to the sender stands for ‘I agree, I feel the same’ since ojo means ‘eight’ and ‘agreed’ (AS, p. 16).

The ability to store numerical information has always been an integral part of writing (with the Mayas, for example, Hebrew script, and the Roman alphabet). Pebbles, shells, beans, beads or pieces of wood (fig. 5) can be used to store numerical data. On a more sophisticated level, tallies and knotted cords fulfil the same role. Tallies are usually sticks or rods of wood (sometimes also poles, house walls, doors etc.) into which notches or grooves have been cut to record the existence and memory of particular objects, numbers or events — such as the number of animals hunted, enemies killed, men or horses required in a particular camp, the days of a journey or the duration of an absence from home, the number and (depending on the type of individual marks) quality of goods sold, and so forth. The main purpose of the tally however has always been the recording of debts. Once a stick has been marked it can be split lengthwise, giving both the creditor and the debtor an incorruptible account of the amount of money or goods involved. Tallies have been used

5 A tally (kape) from the Torres Strait Islands. (British Museum; Museum of Mankind; 89 + 122)
in most parts of the world and by nearly all societies. Some scholars have even suggested that the tally was important, if not instrumental, in the development of the Chinese script (10, p. 27). In England the chief interest of the tally centres around its public use. Soon after 1100 BC tallies became recognized forms of receipt for payments into the Royal Treasury, a situation which continued until 1826 (hence such terms as ‘tally clerk’).

The use of knotted cords was equally widespread. Though normally a means of enumeration, a memory aid for the keeping of statistical records, knotted cords have also been cited in connection with the development of writing. In this context they are supposed to have been used in ancient China, Tibet, Japan, Siberia, Africa, California and the Polynesian Islands. In Hawaii they played an important role in the gathering of taxes, and in the Solomon Islands strings with knots and loops are still used for the exchange of news. The best-known and most accomplished version of the knotted cord is the quipu of ancient Peru. (fig. 6). Quipus were a highly efficient means of information storage, and Inca (see p. 77) administration greatly depended on them. They may also have been adapted, at least in part, to the sounds of the Inca language.

Geometrical and abstract symbols and signs such as circles, wheels, loops, combs, triangles, arches, spirals, zigzag lines etc. are already to be found — sometimes side by side with figurative representations, often alone — in a large number of prehistoric and later rock-drawings. Their exact meaning is still largely enigmatic, but they seem to have been a constant (archetypal?) feature, reappearing again and again in connection with property marks, marks of identification and distinction (and later) scripts. In the case of scripts, such signs are mostly, though not always, abstractions of previous pictorial signs. But attempts to interpret signs found outside the realm of systematic writing (the majority and the most ancient ones) remain largely speculative.

When, at the turn of the century, the French scholar Pierre described a cave near the Spanish border small pieces of flint dating from c. 12000–8000 BC which were decorated with signs painted in red and black, the outer appearance of some (though by no means all) signs tempted a number of scholars to speculate, not very convincingly, about possible connections with signs found in fully-established phonetic systems of writing such as the Aegean syllabaries, the Semitic consonant scripts and even the alphabet (11, p. 37). But apart from the long time interval (some six to eight millennia) and the fact that similar signs have also been found on pieces of stone, on pebbles, bones, or rock-faces, in areas geographically (and historically) far removed from the Mediterranean, any comparison based entirely on the outward appearance of individual signs more or less chosen at random from two entirely different forms of information storage, one known (script), the other unknown, is usually quite meaningless. More plausible, but in the end equally uncertain, are attempts at an internal, representational interpretation — for example, circle for sun, comb for woman/spinning, spiral for worm/sun/water-hole and so on — which suggests that such signs are conventionalized simplifications of earlier pictures.

Geometrical signs, symbols and patterns are frequently used as property marks. Property marks are in many ways already a utilitarian form of writing, they can act as ‘signatures’, establishing authority, indicating ownership. They are closely connected with elements congenial to the development of systematic writing; a growing awareness of the importance of personal property, a realization that in a differentiated society property can become a means to status, a desire to protect and/or exchange such property and the realization that property must be administratively identifiable.

In ancient Mesopotamia (see p. 65) seals bearing personal patterns (fig. 7) which served as ‘signatures’ were already used in the 4th millennium BC. After 3000 BC, with trade and commerce rapidly gaining prominence, their importance increased. Writing had by then become well-established, but it was a complex art practised mainly by a professionally-trained class of scribes. Traders needed quicker and simpler means of identifying their belongings, authorizing their contracts, marking their property. The connection between seals, property marks and systematic writing is an interesting one. The still enigmatic signs on the seals from the Indus valley (see p. 67) are a case in point.

Simple forms of property marks have been used in all ages and by nearly all people. Nomadic herdsmen and settled cattle-breeder alike have always used them, right up to the present time, for the branding of their livestock. Societies with an economy dependent on slave labour have similarly employed them. On a different and more refined level, branding and tattooing can be a voluntary indication of the complete identification between an individual and a deity, or an individual and a specific group. Into the same category fall clan and house marks, which have sometimes been used as signatures by people unable to read and write. The pottery marks from ancient Egypt have their modern equivalents in ceramic marks and in the hallmarks made on silver and other precious metals. There are furthermore the marks of masons from the ancient Aegean region, from Palestine, Anatolia.
or medieval Europe, the various trade and inn signs, and the heraldic devices which proclaim identification with a particular (usually prestigious) family or lineage. Such signs and symbols (as indeed regimental badges, banners, national flags etc.) indicate proprietary rights, the belonging of a person, an animal, an object or a piece of land to a
group, a clan, a family, a deity, a country or simply another human being.

Helpful to the communication and retention of data are mnemonic devices or memory aids. ‘Memory aids’ cover an exceedingly large area of information storage; indeed up to a
point all writing is a form of memory aid. Memory aids hold a transitional position between
oral tradition and writing, often being made legible only by skilled interpreters conversant
with their own cultural heritage and traditional methods of explanation. Such interpreters
can wield considerable power and influence, since it is left to them to decide how much of
the information thus stored should be disclosed to which section of society. Often the
interpretation of memory aids depends on additional, orally transmitted — perhaps even
secret — knowledge.

Memory aids can be simple objects, decorations on objects, symbols, signs, patterns,
single or narrative pictures. Some memory aids are highly sophisticated and already cross
the boundaries between pure idea transmission, picture-writing, pictography and
phonic script. Memory aids can be important records and archives of tribal life, storing
sacred and profane history, referring to legends and actual events alike.

The Maori of New Zealand for example used saw-shaped wooden boards called he rukau
whakapapa (rukau = wood, whakapapa = genealogy) to keep their genealogical records (fig.
8) and youths were taught to recite the name of each ancestor with reference to each notch.
The churingas (fig. 9) of the Australian aborigines (stone plaques or wooden tablets
engraved with abstract line designs) relate to man’s distant ancestors, mythical beings who

9 A stone churinga from Central Australia. (British Museum; Museum of Mankind; 1935. 4112.1)
10. Mud scroll with picture recording traditional lore. Collected from a Minnesota Ojibwa Chief, c. 1850. Such scrolls relate to the Midewiwin, the Medicine Dance, which still exists in Ojibwa and other Great Lake communities. (British Museum, Museum of Mankind, 1949. AM. 22. 170)

11. Dakota winter count from northern America. (British Museum, Museum of Mankind; 1942. AM. 7-2)

had the characteristics of both man and animal and who, during ‘dream time’, moved about the as yet physically undifferentiated country. By their actions the ‘dream time’ heroes shaped the environment and set precedents which still govern human conduct. Each charinga tells a story connected with a particular totemic creature and the land on which the clan lived. Charingas were hidden in sacred places which women and uninstructed youths were forbidden, on pain of death, to visit.

North American totem poles record family (clan) history, legends and important events. Similarly much of the knowledge necessary to perform the Midewiwin, or Medicine Dance, of the central Algonquin peoples, as well as the memory of the dances and songs performed at the meetings of the Mide society, is inscribed on song-boards or birch-bark scrolls (fig. 10). The winter counts (fig. 11) of the Dakota Indians give a chronological account of the most recent history of the group and act as annals for the whole community. They can span a period of up to seventy years, each year being characterized by an outstanding and memorable event. For example, a drawing of the head and body of a man covered with red spots records the fact that many people died of smallpox; while three columns of ten parallel lines each drawn in black means that thirty Dakota were killed in the course of a particular year.
Memory aids can also play a role in the secret and political life of the community. An example is the Lukusa (fig. 12), the ‘long hand’ or claw, an esoteric memory device that was created, manipulated and protected by the mbudye, a once powerful secret society of the Luba people of Zaire (Africa) (1928, p.49).

As we have seen, objects (Yoruba love letters) and decorations (Ashanti proverbs) can already establish links, albeit tentative, with linguistic and phonetic forms of information storage; but the decisive transition from idea transmission to a more systematic and ultimately phonetic form of writing was probably made in the realm of memory aids. The usual picture-writing of the North American Indians, for example, is generally referred to as holoknu. There exists however a second form of picture-writing called holoknu. The latter is known only to the priests who use it to memorise the correct order, and also the exact wording, of magic spells and incantations. Here the pictures represent not an idea or concept or event, but a definite sentence or verse, and in each case there exists only one possible spoken form to correspond with one particular picture. The pictures are read, in fact, exactly like a text. At an even more sophisticated level, memory aids can be integral elements of an already (partly) phonetic script. The writing of the Aztecs of Mexico (Plate I) was to some extent a form of memory aid which could be made legible only through the intermediary of trained interpreters (see p.76).

12 Lukusa, a mnemonic device used by the Luba people of Zaire in passing on mythological and moral lessons to initiates to the Luba secret society. The front of the board shows anthropomorphic carvings in high relief, the back depicts a turtle, an often used tribalistic symbolisms, from the northern Shaba region (formerly Katanga Province), Africa. (British Museum, Museum of Mankind; 1954. Af. 23. Q.)

13 A folio for Captain James Lowle’s (c. 1795–1852) Siam book depicting the Last Ten Birth Tales or previous lives of the Buddha. (British Library, Oriental Collections; Add. 23730, ff. 11/12)
information through the medium of art. The difference between picture-writing and pictography (Egyptian hieroglyphs and similar forms of writing), on the other hand, lies mainly in the fact that pictography has already reached a quite high level of abstraction, codification and conventionalization as far as the shape of individual (picture) signs is concerned. In pictography each sign has, at least to begin with, a definite meaning, corresponding in most cases to one word of a particular language. The signs used in picture-writing acquire meaning mainly through their combination with each other. They are meant to represent the whole thought-process as opposed to breaking the thought-process into the phonetic components of a particular language — words, syllables, consonants, vowels. In pictography the number of signs is more or less static; they can no longer be chosen or increased at random. In fact the tendency is for a move towards economization and a decrease in the number of signs (here Chinese is again the exception).

In addition the order of (picture) signs follows in most cases certain (syntactic) rules. In other words, linguistic (and eventually phonetic) elements are becoming an important component of information storage.

Picture-writing and idea transmission are still very much part of our everyday life. A person can drive from Edinburgh to Marseilles without understanding a single word of either French or English, and obtain all necessary information by way of pictures and symbols. Such a traveller will be kept well informed about which turning to take where, which road has the right of way, where it is advisable to drive more carefully because of roadworks, accidents, railway crossings, floods, bridges (or no bridges); where there are areas suitable for rest and recreation; where food, drink, petrol, perhaps even a bed for the night, are available. In addition to such notices and warnings, the traveller learns about the history and the most desirable features of the environment surrounding the vicinity of the main road; where there are abbeys, walled cities, a fortified castle, prehistoric remains worth visiting, a forest with rare animals (and what type of animals), the most important crops of the area, provision for sailing, boating, riding, pony trekking, fishing, golf, shooting, whether there is a beach nearby, a swimming pool or simply a very good vineyard which may make an overnight stop worthwhile (Plate II).

Pictures and symbols are important aids to international trade and commerce. A garment may have been made in Japan, Hong Kong, Korea, Taiwan, Germany, Brazil or India by people speaking no common language and unable to read each other's scripts, but somewhere inside it there will be a label with signs telling us whether it should be dry-cleaned, hand-washed, drip-dried, ironed (with a hot or cool iron), and whether it can be bleached. The weather forecasts on television can comfortably be understood by anybody, without any knowledge of the language used by the newscaster; a more or less internationally accepted series of pictures (a stylized black cloud for rain, a stylized white cloud with yellow or white lines radiating from it for sunshine, a cloud with suitably shaped symbols for snow) tell us what to expect for the next day or the coming weekend.

We are surrounded by picture-writing. Some of the signs and pictures have become internationally accepted by common usage. Others, such as those used for safety, engineering, in science, medicine, pharmacy or for computer technology have more or less been agreed upon.

As new technology diminishes the importance of writing (see p. 210) the picture becomes again a favoured form of communication. International travel, international commerce and the necessity for cooperation in matters of industry, safety, defence and trade have created the need for easily-understood — that is, more or less self-evident — forms of communication and information storage which can transcend the boundaries of language. An interesting development in this direction is the increased popularity of 'coffee-table

14 Codex Mendoza (P. 3), written for Don Antonio de Mendoza, the first Spanish Viceroy of 'New Spain' (1535–1550). The drawings made by the Mexican, Tlaxcalo, depict the daily life of the Aztecs; the Spanish 'commentary' is based on explanations supplied by local informants. Folio 60 demonstrates the strict way children were disciplined and taught. (Bodleian Library, Oxford; Ms Arch. Selld. A.1. , f.60)
books' which are more or less picture books using photographs and a minimum of text. Equally on the increase is the popularity of strip-cartoons either in serialized form or in the form of books, where drawings are annotated by simple sentences (of dialogue or explanation) written more or less into the margin — a method similar to that used, for example, in some manuscripts produced after the conquest of Mexico by Spanish or native scribes and artists (fig. 14).

Picture-writing takes us right into the future: Pioneer 10, the unmanned spacecraft launched in 1972, which has already left the solar system on its journey into space, carries a message from mankind a gold-anodized aluminum plaque engraved with the drawing of a nude man and woman, with the man's hand raised in a gesture of greeting (to show what we look like and to indicate that we are friendly towards any unknown life-form the spacecraft may encounter), and a series of symbols which testify to the level of scientific and technological development we had reached at the start of the journey.

Language and writing

In the previous section we have already met examples of an elementary interaction between language and writing. One is the hekunom picture-writing of the North American 'medicine men', where pictures no longer stand just for ideas or concepts but for definite linguistic expression: a visual sign equals a sentence in a definite language. Another, that from Nigeria, brings us even closer to a phonetic form of information storage. Six cowrie shells mean 'I am attracted' because the Yoruba word ofa means both 'six' and 'attracted'. We have here, in embryo, one of the most important principles in the development of phonetic writing, namely the principle of rebus transfer. By one dictionary definition rebus means 'the enigmatic representation of name, word etc. by pictures etc. suggesting its syllables' (ofa - six is being represented by the six cowrie shells). Rebus transfer occurs if, once the phonetic interpretation of a particular sign has been established, this sign is then used to represent another word which means something quite different but which sounds at least similar (ofa - six, represented by six cowrie shells, becomes ofa - attracted, still represented by six cowrie shells). This process can be taken further; the phonetic unit (word, syllable or consonant group) can be used to form a component of another word, even that of a different language.

As has already been pointed out, the connection between language and writing is by no means as self-evident and fundamental as we, on the basis of our own background and experience, might be tempted to think. The primary object of all information storage is the preservation of knowledge. Knowledge can consist of thoughts, ideas, facts, concepts; it can be totally visual as in the case of art, acoustic as in the case of music, numerical as in the case of mathematics, physics, chemistry; in fact knowledge constitutes the sum total of all (up to date) human experience. It is only in so far as knowledge is expressed through the medium of language that information storage becomes identical with written language. Even on these premises written language and spoken language are by no means always identical, neither in the representation of sounds through script signs (there are at least five different ways of pronouncing the vowel sign a in English) nor in the use of words, or the way sentences are phrased. One language can also be written in several different scripts. The ancient Egyptian language, for example, used simultaneously three different forms of writing: hieroglyphic, hieratic and demotic (see p.63). From the 2nd century BC onwards it was also written in the Greek, and from the 4th century AD onwards in the Coptic alphabet.

The most remarkable disregard for the writing/language connection shows itself in the way a script, designed for one particular language, is at times adopted for the use of another, totally different, language. A striking example is the cuneiform script (see p.65), originally designed for the agglutinative Sumerian language in which syllables and vowels played an important part. This script was taken over by the Semitic Babylonians to serve a language in which the meaning of words depended on the grouping of consonants, and where vowels played only a subsidiary part. Similarly the Chinese script, designed for a language with practically no grammar and a large number of homonyms monosyllabic
words, was made to fit, with the aid of complex auxiliary additions, the agglutinative Japanese language, full of formal words and endowed with a very complex grammatical structure (see p.84). It could be argued that neither the Japanes nor the Babylonians possessed a script of their own, and that their choice was therefore limited and predetermined. But in our own more immediate past both the Russian Cyrillic and the Roman alphabet, being the scripts of economically and politically dominant groups, have been superimposed on a large number of Asian languages which already possessed perfectly serviceable forms of writing.

This of course does not mean that the connection between script and language is negligible or wholly arbitrary. As we shall see later, script, language and nationality (sometimes script and nationality alone) often become identified with each other, forming a strong and potentially powerful unit. During the long centuries of the Diaspora, the Hebrew script became a symbol of Jewish identity and was used for various languages in the countries of adoption. Thus Ladino (a Spanish dialect) and Yiddish (a German dialect) were both written in Hebrew characters, just as in Spain, during the period of Arab domination, the Jews spoke Arabic, but wrote it in the Hebrew script.

After the end of the Second World War a mission consisting of twenty-seven American educationists recommended to General MacArthur a drastic overhauling of the Japanese education system. They called especially for the abolition of the 'Chinese-derived ideograms', since otherwise Japan could never hope to achieve technological parity with the West (100, p.174). Today Japan has not only achieved this parity, but seems uncomfortably close to overtaking the West, and this despite the fact that the Japanese still use their 'Chinese-derived ideograms', and that it takes Japanese schoolchildren two years longer than their Western counterparts to learn how to read and write. As we move towards the 21st century, the 19th-century concept of the alphabet as a Platonic idea towards which all writing (and information storage) must by necessity progress becomes less and less tenable.

The process of writing

The logistics of information storage necessitate objects on which this information can be stored; writing becomes writing when it is written down on some type of writing material. In the course of time (some 20,000 years if we take the concept of writing in its widest sense, nearly 6,000 years if we restrict ourselves to codified systems) any imaginable type of material has at one time or the other been used for this purpose: stone, wood, metal, animal skins, leaves, bones, shells, clay, wax, pottery, silk, cotton, paper etc. If we examine this list, and it is by no means complete, we can see that the materials named can be divided into two main groups — perishable materials and imperishable materials. And here we immediately come across one of the main difficulties in any study of the history and development of writing. Many ancient systems of writing, like those used in Egypt or India, seem to have appeared more or less fully-fledged, simply because we encounter them first on imperishable material, mostly on stone. But as we know from later examples, writing on perishable material is nearly always preceded (and accompanied) by writing on perishable materials: Roman-type wax tablets (fig. 15) for taking notes were still in

15 Roman sized writing-tablets, 3rd century AD. The note-book consists of nine leaves, including those serving as covers, and is fastened together with leather-laces. The notes are written in Greek longhand and shorthand, some of the latter evidently for practice. (British Library; Department of Manuscripts; Add. 33270)
Types of writing material

Some writing materials suggest themselves since they can be used without, or with only a minimum amount of, preparation. Stone is perhaps the most obvious one. It is perfectly serviceable in its most natural state (the surface of rock or cave walls can be used for painting and engraving), or it can be fashioned into polished slabs. Stone has the added advantage of being very nearly indestructible (except by human hands), thus guaranteeing the permanence of the information recorded. This indestructibility has indeed made it throughout history the most favoured material for pronouncements issuing from the two central institutions of social, economic and political life: the Palace and the Temple — or, as we would call them today, the Church and the State. In Egypt and Mesopotamia, stone inscriptions in monumental form, on rough or prepared rock surfaces, on slabs, megaliths or buildings, date back to the 4th millennium BC. The ancient world, Asia from the Near East to China, Imperial Rome, and indeed all major civilizations right up to the immediate present have followed this example; we have only to think of the ceremonial unveiling of inscribed stone plaques to commemorate the opening of a bridge or building which are regularly reported by the media.

Equally accessible are leaves — which were no doubt used together with, and long before, stone. To paint or incise a figure or symbol on a dried leaf takes less technical skill than to engrave a carefully prepared piece of stone. Unfortunately leaves, especially untreated leaves, are also most easily perishable, and much that could help us to trace and understand the development of writing is therefore lost to us.

Other materials readily available and easy to use are wood, bones, bamboo, tortoise-shell and the bark of trees. Some of the earliest examples of Chinese writing appear on the so-called oracle bones from the Shang period (c. 1766–1122 BC, see fig. 17) which belong to the ‘jagazine’, the ‘documents on tortoise-shell and animal bones’. Animal bones, especially those of larger species such as sheep, goats, camels or even horses, were used in many parts of Asia and Africa. Incised bones have survived from prehistoric Europe and from Central America where the Mayas (and others) made special use of them (fig. 18). The Arabs, well into the Middle Ages, considered bones a cheap and convenient form of material for the writing of documents, magical texts, even verses of the Koran. Indeed, according to some traditions the last will of the Prophet was taken down in this fashion.

Ivory from the tusks of elephants is a rare and therefore more expensive variation. It also requires a higher level of technical skill to write on (especially if split into thin sheets as in Southeast Asia), and a society already conscious of status symbolized by the display of wealth. Ivory was used in Egypt and in the Middle East of Biblical times, but as far as the production of whole manuscripts is concerned it was mainly restricted to Southeast Asia.

A cheap and easy-to-use material, and one that was throughout history readily available in most, though not all, parts of the world, is wood (fig. 19). Egyptian inscriptions have been preserved on wooden statues and sarcophagi, the earliest surviving examples of a wooden writing-board coming from the Middle Kingdom (2134–1789 BC). Preparations for making it usable were minimal. Once boards or tablets had been shaped — a process that needs little technical skill — wood could be left in its natural state and the writing could be done with ink (or paint) either with a brush or pen. Alternatively the boards could be varnished, lacquered or polished to create a glossy, smooth surface. In some cases the script was incised with a sharp instrument, a stylus or a knife. Wood is still used in the form of blackboards by schoolteachers, and, until very recently, pupils too would write their exercises on small wooden boards, in both cases with white chalk on a blackened surface. Since the script can easily be erased with a cloth or a wet sponge, blackboards are highly
THE PROCESS OF WRITING

Economical, especially for the purpose of taking notes or writing out exercises. They can also be re-used almost indefinitely.

The Greeks and Romans used waxed writing tablets (see fig. 15) for taking notes, a habit they probably acquired from the Near East where such tablets, dating from the 8th century BC, have been found in the Assyrian city of Ninrud. Greek and Roman writing tablets consisted of thin rectangular boards with a slightly hollowed-out surface filled with black wax. They were used together with a metal stylus, pointed at one end (for writing) and flattened at the other (for erasing the script and smoothing the wax surface). A number of tablets laced together formed a book, or, as it was referred to, a codex.

Equally easy to handle but more dependent on availability were bamboo (fig. 20) and bark. Whereas bamboo and wood can be used in their natural state, bark needs a certain amount of processing to render it suitable for writing. The most sophisticated and accomplished use of bark comes from Central America. Maya and Aztec manuscripts (see p. 76) are made of deerhide or of long sheets of amatl ‘paper’ manufactured from the fibre, roots and inner bark of the wild fig tree. Their surface is covered with a fine coat of white varnish which contrasts pleasingly with the text painted in a wide range of colours on both sides. The term ‘paper’ is of course strictly speaking a misnomer, but the finished product does indeed look very similar to paper and it is equally durable. Some Aztec manuscripts were made of coarser material derived from the fibre of the agave americana.

In the northern parts of India two varieties of bark enjoyed considerable popularity; the Himalayan birch tree (betula utilis) and the aloe (aegialaria agallocha). The earliest extant birch bark folios, cut, polished and oiled, are fragments of Buddhist works written at the beginning of the Christian era, but there is reason to believe that birch bark (sometimes in scroll format) was already in use at the time of Alexander’s invasion (326 BC). In Kashmir birch bark manuscripts, the folios cut in codex form and bound between leather covers,
were still used in the 16th and 17th centuries (fig. 21). Birch bark can be rather fragile, and in
the north-east of the sub-continent manuscripts made from the bark of the aloe were at
times reinforced by woven boards to increase their durability. An interesting variety of
bark manuscripts are the purushas, the private notebooks of the Batak medicine-men which
can still be found in Sumatra. Long sheets of thick, coarse bark are folded accordion-wise
into squares and protected on both sides by strong wooden covers (fig. 22).

Many materials were primarily designed for a different purpose and for different use.
These are silk, cotton, linen, metal, ostraca (pieces of broken pottery) and various utensils
and objects such as swords, glass lamps, bronze vessels (fig. 23), furniture, fans etc. In
terms of information storage, the status of metal, in particular that of bronze, is very similar
to that of stone: both guaranteed permanence. The Roman laws are supposed to have been
kept on the Capitol, inscribed in bronze. In India and Southeast Asia, where until very
recently the main writing material was the highly perishable palm-leaf, important legal
documents, especially entitlements to land, were usually engraved on specially fashioned
copper plates (see fig. 16). Occasionally Jain, Buddhist and Hindu scriptures were
accorded similar treatment.