

New light on celebrated city

In the 25 February issue of *Science* there is an account of issues discussed at the Oxford Centre for Maritime Archaeology last December. The city and harbour of Alexandria, site of the tomb of Alexander the Great and the place where Cleopatra died, was once the meeting place of merchants and philosophers alike, and was noted especially for its Pharos lighthouse, one of the wonders of the world. Later excavations and undersea exploration have added to the picture we have of this famous place.

According to tradition, Alexandria was founded in 332BC on a narrow strip of land between Lake Mareotis and the Mediterranean, and it soon became the capital and largest port of Egypt. Temples, palaces and the famous library were built and, in Roman times, grain was exported to all corners of the Empire. But within a few centuries the city was lost to history. Archaeologists have found the remains of the ancient city some 10 to 12 metres below the present surface. A complex of lecture halls has witnessed to Alexandria's past intellectual and social life. These are thought to have been constructed in the late fifth and early sixth centuries AD. Near the modern breakwater in the harbour statuary



and possible fragments of the ancient Pharos have been found under the water.

There is also evidence that gradual and sometimes sudden subsidence took place beneath the city, brought about by earthquakes and incursions of the sea. There are historical records of active periods of earth tremors from the fourth to the sixth centuries AD.

There are three more submerged cities nearby and much of the area is at least 6m deep in the ocean. Some of the sunken cities have yielded human remains under collapsed walls. Perhaps a shifting of the bed of the Nile after oceanic storms occurred. The lesson to be learnt is that buildings on unstable deltas are liable to collapse and that human efforts may be thwarted without notice by the elemental forces of nature.

Skeleton of a strange dispute between archaeologists

Archaeological researchers have recently been engaging in a dispute regarding a strange miniature skeleton discovered in a cave in the Indonesian island of Flores. A team led by Mike Morwood of the University of New England discovered the human bones but a local archaeologist, Teku Jacob, claimed the right to examine them and was allowed to take them to his laboratory, so that other experts have been denied access to them. They have now been restored to their original finders, according to a report in *Nature* for 3 March, after what is described as an unethical act of delay.

The situation has been made worse by claims from Jacob that the remains are of a pygmy *Homo sapiens* and not of a separate species, *H floresiensis*, as originally claimed. Jacob argued that the dwarfed skull was attributed to a congenital defect, something disputed by experts from California and London. Two other investigators were given access to the bones in defiance of ethical considerations, but were allowed time only for brief examination. On two occasions Jacob failed to return the bones. He eventually did so, but minus several fragments of rib sent for genetic analysis to other laboratories, one in Germany. The team of discoverers is demanding the immediate return of these materials.

Meanwhile, the recovered bones are under lock and key and in Indonesia further explorations hope to track down other remains of the mysterious pygmy race.

Plucking the fruit of memory and running the risk of spoiling its bloom

Memory is a strange phenomenon with which we all have to cope. It involves two processes: the first is the learning of new skills, new behaviour patterns or pieces of information; later comes the recall or re-expression of the skill or information, a process known as retrieval. Memory has different aspects known as sensory memory, working memory and long-term memory. Short-term memory, which is essentially sensory, is lost unless it is transferred into the long-term bank. But, once transferred, it may be difficult to erase, even when we would much rather forget its origin for our own peace of mind.

Joseph Conrad in 1924 commented: "In plucking the fruit of memory, one runs the risk of spoiling its bloom." Macbeth complained: "Canst thou not minister to a mind diseased, Pluck from the memory a rooted sorrow?" And Thomas De Quincey, in his 'Confessions of an Opium-eater' (1822), lamented: "It is notorious that the memory strengthens as you lay burdens upon it, and becomes trustworthy as you trust it." And although environment has scant effect upon the power of

remembering, mood at the time of initial stimulus is an important factor in aiding or diminishing it. Thus, recollection of a sensation may be a two-edged process, for good or ill.

In the *New England Journal of Medicine* for 17 February is a review article on memory dysfunction, a phenomenon encountered in clinical medicine as a feature of many pathological processes. These include neurodegenerative diseases, strokes, tumours, trauma to the head, hypoxia, malnutrition, attention-deficit disorder, depression and drug reactions, as well as the normal ageing process.

Four memory systems of clinical significance are usually distinguished: episodic memory, semantic memory, procedural memory, and working memory. The first of these refers to the recall of personal experiences and depends on activity in the medial temporal lobes of the brain. Recent events are most susceptible, remote events most resistant. The left lobes are most active when words are being learnt, the right lobes where vision is concerned.

Semantic memory refers to the general store of conceptual and factual knowledge of

the individual. Alzheimer's disease is the commonest factor disrupting this. Semantic memory disorder is suspected when a person finds difficulty in recalling a name previously known.

Procedural memory is concerned with the learning of behavioural and cognitive skills which are used automatically and unconsciously. The most common disorder affecting it is Parkinson's disease and it is to be suspected when previously learnt skills have been lost or there is serious impairment of new learning ability.

Working memory, involving the ability to maintain and manipulate knowledge temporarily for an immediate purpose, depends on a network of cortical and subcortical impulses varying with the task. This may be impaired in several conditions such as Alzheimer's Parkinson's and Huntington's diseases.

Memory cannot be regarded as a simple concept, but it is regulated by a host of separate distinct neurological systems, of which several may be impaired in neurodegenerative disorders.