

Patterns of sleep

An editorial in *Nature* for 30 October draws attention to the fact that before the availability of electric light people were forced to make the most of the limited hours of daylight and that meant rising with the lark and stopping work at the going down of the sun. Those who wanted to achieve as much work as possible had no alternative.

Today, with all our artificial lighting aids, we are no longer obliged to follow such a programme, and this has changed the working day for many of us, and the patterns of day and night may be adjusted in accordance with what we or our employers fancy is efficient. Sometimes we find ourselves working in defiance of our natural circadian rhythms, which is not good for our physical or mental health. We must pay more attention to our body's rhythm if we are to avoid undesirable lifestyles.

Our daily cycles of sleep and wakefulness, circulating hormone levels and body temperature can vary dramatically between individuals. It is considered usual to enjoy some eight hours of sleep between 11pm and 7am but individual preferences operate and circadian phases alter with age and may be seriously affected by various conditions such as Alzheimer's disease and schizophrenia. Also, working conditions habits and the need to concentrate on special tasks often call for changes in sleep. In the same issue of *Nature*, Alison Abbott has summarised some aspects of the circadian dilemma.

With the appearance of the phenomenon of jet lag in air travellers, attention has been turned towards the role of melatonin in controlling body rhythms. This hormone is secreted by the pineal gland during darkness, but its level falls with the impact of light and the change affects the function of the hypothalamus. With a healthy function, body temperature, cortisol secretion and the onset of sleep or wakefulness vary regularly according to habit under the control of time-keeping genes. In old age less melatonin is produced, and sleep may therefore be disturbed. Exposure to bright light during the day increases nocturnal melatonin and so promotes sleep. Sufferers from Alzheimer's disease often become active at night, to the disadvantage of their carers. People with schizophrenia tend to show a similar pattern.

It is recognised, too, that depression attributed to seasonal affective disorder is something to be taken seriously. Appropriate treatment with light may relieve the condition within a week, whereas pharmacological treatment with antidepressants is far less effective. Working demands in modern society unfortunately neglect the importance of circadian biology, and night shift work, in particular, tends to be inefficient because daylight exposure cannot play its normal controlling role. Academic studies, too, suffer when due attention is not paid to circadian

phenomena. Adolescents pay most attention to evenings, and lack mental alertness in the early morning, and critics have condemned the tendency in some countries to begin school days at 7 or 8am. It is beginning to be recognised that the effects of recent discoveries of circadian biology should be given serious consideration by politicians and the agencies which they control.

Civilised living

It is not often that we pause to consider what is meant by civilisation. Indeed, it is something we assume envelops our day-to-day existence, always provided we are not personally involved in the circumstances of warfare of some kind or another. We define it as an advanced stage or system of social development, and the verb "to civilise" means to draw out of barbarism and to enlighten, refine and educate.

There is, however, plenty of barbarism still in our modern world, evident in the way we often treat animals, even those which rank as pets, and often with our own kith and kin in what should be the security of the home and family. Refinement and enlightenment appear to be attributes of a minority of humans. As for education, we recognise today that it is a curiously elusive enterprise, subject to economic constraints and social difference. In our materialistic and narrow-minded culture we neglect the social implications of a restricted curriculum.

So, in the event, our education process is not well calculated to produce a high degree of civilisation, but rather an attitude to living that demands more machines and gadgets at any price. In short, we are in the process of distorting our scale of values. We are creating what has been described as "push-button civilisation", and Brewer's 'Dictionary of phrase and fable' (1999) remarks that this is "a phrase descriptive of the highly industrialised nations of the world where household chores are performed and entertainment provided by electrical appliances operated by 'push button' controls".

In this connection, the mathematician and philosopher Alfred North Whitehouse commented that "civilisation advances by extending the number of important operations which we can perform without thinking about them".

Yet, when we look at the wider aspects of civilisation, we must remember that certain phenomena, such as irresponsibility and crime, and, on the personal level, sympathy and empathy, are essential parts of a civilised world.

The art of the embalmer

Most information regarding the materials used in mummification procedures in dynastic Egypt has been derived from ancient texts. Herodotus and Pliny the Elder have described the use of the oil from the cedar tree. But later scholars have argued that the preservative oils were in fact derived from the juniper and not the cedar. Hitherto chemical analysis has not been undertaken to determine the truth of the matter, but a report in *Nature* for 23 October describes the use of gas chromatography to analyse the constituents of a sample of unused embalming material dating from 1500BC discovered at a site in Deir el-Bahari in Egypt. A team of German scientists prepared a methanolic extract of some embalming material found near a mummy of the 18th dynasty and examined it.



There was no evidence of diterpenoid or triterpenoid resins, but a series of phenolics, including cresols, xylenols, guaiacols, naphthalenes and azulenes were detected. Some of these phenolics were probably produced by smouldering wood. The dimethoxy phenols were probably formed by heating the hard wood of deciduous trees. The guaiacols indicate a coniferous wood. The brown embalming resin found contained sesquiterpenoids indicative of cedar wood. There was some confusion in the distant past between cedar and juniper trees and the names have sometimes been misapplied.

It has been reported that the surfaces of mummies embalmed with liquid tars or liquid resins are essentially free from contaminating micro-organisms, and these material also preserve alkaline phosphatase in bone for thousands of years. Guaiacil was found by experiment to be most effective in preserving alkaline phosphatase. Liquid tars in general are evidently most effective when mummification is attempted, and the claim by Herodotus and Pliny that a "strong liquid" was used by the ancient Egyptians embalmers is confirmed.