

Tricky chocolate

The dietary flavonoids present in chocolate, (-)epicatechin in particular, are generally supposed to promote cardiovascular health through direct antioxidant effects or antithrombotic mechanisms. That this depends upon other factors appears from research published in *Nature* for 28 August. This reports that consumption of plain dark chocolate increases both total antioxidant capacity and the (-)epicatechin content of the blood plasma. But these effects are markedly reduced when milk is consumed with the chocolate or when the chocolate has been blended to make milk chocolate.

When dark chocolate and milk chocolate prepared from the same batch of cocoa beans were assayed for total antioxidant potential, it was calculated that to receive a similar intake of antioxidants twice as much milk as plain chocolate would be required. Healthy volunteers aged 25–35 were non-smokers, had normal blood lipid levels, were taking no drugs or vitamin supplements, had an average weight of 65.8kg and a body-mass index of 21.9kg/m². They consumed 100g dark chocolate, 100g dark chocolate plus 200ml full cream milk or 200g milk chocolate on different days. Their plasma antioxidant levels one hour after the consumption increased significantly after dark chocolate alone, returning to base levels after four hours. Milk chocolate alone or dark chocolate plus milk failed to alter the antioxidant levels. Absorption of (-)epicatechin was significantly less when the chocolate contained milk or milk was added to the dose. It is suggested that this effect may be due to formation of secondary bonds between chocolate flavonoids and milk proteins, which would depress biological accessibility of the antioxidant principles normally present in chocolate.

Mystic number

For personal reasons, the number five has special significance for me. Yet I find that there is far more to the mystique of this number than appears at first sight. According to Pythagoras, the number five prevailed in art and in nature alike. And Virgil in his *Eclagues* remarked “Numero deus impari gaudet”, meaning that the gods delight in odd numbers. In many ancient beliefs the odd, as opposed to the even, numbers were regarded as fortunate.

We recognise five senses, five fingers, five toes and five continents. Artist schemes make use of the human figure depicted as two pairs of outstretched limbs plus an outstanding head. Many of the flowers we admire possess five petals and five sepals. Most starfish possess five arms. Then there are many social applications of five elements which carry no obvious logic. In ancient Europe the Greek quinquereme was a warship rowed by oarsmen arranged in five

banks. Five per cent was once the accepted rate of interest on a financial loan, though modern economists would consider it inadequate. In Shakespeare’s *Tempest*, Ariel sings: “Full fathom five thy father lies”, though the significance of that depth (30ft or 10m) is not apparent, and we must suppose the word allowed a neat alliteration that appealed to the poet. Then there was the celebrated pentacle, the five-pointed star believed to offer protection against witchcraft and sorcery. What inspired the Pentagon in Washington I do not know, but perhaps it was superstition. Last but not least is the famous Chanel Number Five devised by Coco Chanel.

Birdsbout

In *Nature* for 17 July two behavioural biologists from the University of Leiden report an investigation of an interaction between song-birds and the modern human environment. They found that the urban great tit (*Parus major*) when resident in a noisy location raises the mean frequency of its song. The object is to prevent the song from being masked by the surrounding predominately low-frequency noise. This action helps their breeding success rate in a world dominated by human-induced noise.



Cars, planes and a variety of other machinery exert pressure upon those wild animals that rely upon acoustic communication with one another. Some species are able to adapt their conversation to the competing noise, while others cannot do so. Measurements in the city of Leiden showed marked variations in noise intensity, ranging from 42 to 63 decibels, from very quiet in residential areas to extremely noisy near busy highways and junctions.

The 32 male great tits observed in Leiden, each with a characteristic repertoire of three to nine distinct songs, demonstrated an average minimum frequency of 2.82 to 3.77kHz, which showed a correlation with ambient noise both in amplitude and frequency. In noisy territories the birds’

frequency of call was higher than that heard in the quieter ones. It therefore appears that they learn to restrict their notes according to the local noise levels, adjusting song to territory rather than territory to song.

Evidently, alterations of the human environment may change the communication patterns of songbirds in the wild. Man-made noise levels may well affect avian breeding opportunities and contribute to a decline in both the diversity of species and their population density.

Toys for boys

Mechanically and electronically operated gadgets are an ever increasing part of our existence. For many men they are the be-all and end-all of living. Only the most ancient and hard up think of drilling a hole with a hand-turned drill. Only the antediluvian would push a lawn-mower. Only the hopelessly antiquated would consider walking a hundred yards to post a letter; most would jump into the car, or communicate electronically. And many people’s leisure consists of sitting on a soft couch and watching a flickering screen. Physical effort is often represented by pushing a button or clicking a lever. Such is life on earth.

This sort of existence has a sinister side. We have seen that a sedentary existence leads to obesity and all its cardiovascular and other complications, especially when combined with fast food and overeating. But there is a distant perspective which we should not ignore. The long-continued disuse of body structures entails the “use it or lose it” mantra. Darwin in his ‘*Descent of man*’ (1871) maintained that one cause of variation in plants and animals is failure to make normal use of muscles and nerves. Changed living conditions over long periods alter the feature of living organisms, especially stature and muscle strength.

Darwin noted that sailors, as opposed to soldiers, develop differences in body build induced by restrictive working environments. Certain South American tribesmen who spend much time in canoes develop thick arms and thin legs. According to some anthropologists, living in towns and practising certain occupations may not only restrict stature but also reduce energy and moral vigour.

Of course, we must remember that evolutionary changes in habits and physique occur incredibly slowly. If we are looking only to our own lifetimes, we need not worry. Yet we should remain aware of the possibilities. Indeed, the influence of climatic change with its impact on coastlines offers a much more menacing challenge. Our arrogant social leaders are unlikely to contemplate the remote future and our inability to influence it materially. Yet some philosophical musing could possibly prove constructive.