Valley fever. Rocky Mountain spotted fever and Lyme disease could spread northwards.¹⁶

These effects of change in climate will occur against the background of a range of other global environmental threats such as depletion of stratospheric ozone, which is likely to cause increased skin cancer and cataract.¹⁷ Even more important, the world's population is increasing by three people every second. Between 90 and 100 million people will be added every year during the 1990s.¹⁸ In general, the biggest increases will be in the poorest countries. Competition for inadequate resources and rises in sea level are likely to lead to large numbers of environmental refugees. They in turn could spark social unrest and military conflict. Although the developed world will contribute only about 6% to the increase, even this is important because the carbon emissions from fossil fuels per head in a country such as the United States are more than 10 times greater than in Third World countries.¹⁹

International efforts have been made to persuade each country to commit itself to decreasing carbon dioxide emissions by, say, 20% by the year 2000.²⁰ This move was strongly opposed in 1989 at an international meeting in The Netherlands by governments of the United States, Japan, the United Kingdom, and the Soviet Union. The European Community has agreed to stabilise emissions of carbon dioxide by the year 2000 but Britain has been granted a concession to overshoot the deadline by five years. Reductions in carbon emissions could be achieved by increasing energy efficiency and use of renewable sources of energy. Funding for such an initiative could come from military expenditure. In the United Kingdom some 40% of Britain's resource scientists and engineers direct their energies into military activity, but the budget of the government's Energy Efficiency Office is only £15 million annually and is being cut in real terms (although the funds for draughtproofing houses have recently been transferred from the Department of Employment, creating an apparent rise).²¹

More research is needed on the health implications of global environmental change,²² and health professionals²³ could also play an important part in persuading public opinion and

governments that more resources, and some fundamental changes in policy, are needed to avert potential catastrophe.

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Diving into the unknown

A new code of practice should help

In 1988 and 1989 at least 60 patients were admitted to spinal injuries units in the United Kingdom with tetraplegia as a result of diving injuries (unpublished observations). In many of these accidents the victims seemed unaware of the depth of the water and of the dangers of diving too steeply into too shallow water. The problem is often compounded by overconfidence, alcohol, and, we suspect, "macho" behaviour in young men. Some people, however, are rendered tetraplegic simply as a result of a running plunge into the surf, striking their heads on a sand bar. We are concerned that many people are unaware of the dangers of diving and that in many cases these accidents are entirely preventable.

Almost half these injuries occurred in swimming pools, about a third in the sea, and the remainder in rivers, lakes, or ponds. Overwhelmingly the victims were young, with an average age of 24, and almost all were men. The peak incidence of injury was in the summer, over half occurring from June to August. At least a third of the victims had drunk

alcohol before their dive. Over a third sustained their injury in Britain; abroad, the most common locations were Spain and Greece.

Most injuries occur when the head either strikes the bottom of a pool, the sea, or river bed or hits a submerged object such as a rock. The bony injury resulting is nearly always a crush fracture of a lower cervical vertebra, usually C5, associated with retropulsion of the vertebral body and direct injury to the spinal cord.

The number of serious diving injuries is probably underestimated. Some people who develop tetraplegia due to a dangerous dive almost certainly drown if help is not at hand to rescue them. Relevant figures are not available, largely because the signs of cervical spine injury are easily missed at necropsy unless cervical radiographs have been taken.

In 1965 the Amateur Swimming Association informed local authorities that most diving installations were unsafe and did not conform to international guidelines.¹ Within a few months

nearly all dangerous installations had been removed. In 1980 Frankel *et al* reported that tetraplegia due to diving from diving boards had nearly been eliminated but that injuries due to diving into the shallow end of swimming pools and into the sea continued to occur.² They concluded that the public needed further education about the dangers of diving into shallow water.

Recent criticism by the Consumers' Association of current diving safety in swimming pools³ has coincided with both the findings of the British Spinal Injuries Review Committee's subcommittee on spinal cord injury prevention and the publication of a new code of practice for diving into swimming pools and for the teaching of a safer dive.⁴ The code of practice, which has the backing of British aquatic and safety organisations and the Health and Safety Executive, recommends that vertical dives should be prohibited in public swimming pools and be replaced by a flat trajectory dive, correctly named a plunge dive. No diving will be allowed in public pools in less than 1.5 metres of water. Vertical dives will be allowed only in specialised diving areas, physically separated from swimming areas. All future new diving stages and springboards will have to be in specially designated diving pools.

Only a small proportion of water in public pools is deeper than 1.5 metres, which should encourage the safest quick method of entry into the water—that is, by jumping. This, together with enforcement of the plunge dive and teaching of safer diving, should begin to reduce the number of diving injuries. Obviously the code is also relevant to hotel, club, and private pools, and, at least in part, to the newer leisure pools. It should be a means of warning people of the hazards of diving in water of unknown depth and where the water may be cloudy, obscuring dangers such as rocks and tree roots.

The time is now ripe for a concerted prevention campaign in the United Kingdom, similar to that run in Australia since 1982.⁵ The new code of practice will help, as will a pilot leaflet being produced jointly by the Royal Society for the Preven-

tion of Accidents and the Spinal Injuries Association.⁶ This warns of the dangers of diving and will be issued to schools and, we hope, to holidaymakers through tour operators.

The campaign must be directed particularly at young people, the aims being, firstly, to increase awareness of the danger of diving into shallow water or water of unknown depth; secondly, to teach the new diving code; thirdly, to introduce and improve existing signs that warn of shallow water and—in the sea, rivers, or lakes—of hidden obstacles and dangerous currents; and, lastly, to warn of the danger of overconfidence and of diving when under the influence of alcohol. If these aims can be achieved in time for the next holiday season we should begin to see a decline in these essentially preventable injuries.

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Blooming algae

Sewage, fertilisers, detergents, and water temperature may all contribute

Nature reported the presence of an algal bloom, toxic for dogs, sheep, pigs, and horses, in a small Australian lake more than 100 years ago.¹ Since then the toxicity of blue-green algae (cyanobacteria) for animals and humans has been reported from around the world.^{2,3} In England two years ago dogs died after drinking contaminated water from Anglia Water's Rutland reservoir.⁴

Algal blooms may be present in freshwater, marine, and estuarine waters.⁵ There are at least eight different toxic blue-green algae with several subspecies.⁶ Because species may have toxic and non-toxic strains, predicting whether a particular algae bloom will be toxic is impossible. Toxins have been classified into three main groups: neurotoxins, hepatotoxins, and contact irritants.⁷ In addition, pneumonia in canoeists has been associated with contact with cyanobacteria,⁸ blue-green algae have been seen in specimens of diarrhoea from patients with AIDS and travellers to tropical countries,⁹ and Australian researchers have shown that small amounts of toxin are carcinogenic in mice¹⁰—raising the possibility that chronic exposure to small amounts of toxins in drinking water might be carcinogenic.

The precise nature of some of the toxins is unclear, and they

may change from bloom to bloom even for the same species. In healthy and whole cyanobacteria the neurotoxins and hepatotoxins seem mainly to be retained within the cells.¹¹ Cell lysis releases the toxins, which occurs most frequently in late summer and early autumn.⁶

Undoubtedly, algae are multiplying much more rapidly than before. One explanation may be that the toxins produced by the cyanobacteria suppress the growth of other phytoplankton. The temperature of water and how much carbon dioxide, phosphates, and total nitrogen it contains all affect the production of toxin.^{7,12} An increased nutrient load of nitrates and phosphates from farms and human habitations may explain some of the altered chemistry in water courses. For example, sewage, which is high in nitrates and phosphates, is now discharged into water courses whereas middens and the contents of privies were returned to the surrounding land as night soil. And detergents, present in household waste water since the end of the second world war, until very recently contained high concentrations of phosphates. Will lowering the concentrations of nitrate and phosphate in water courses therefore reduce the growth of algal blooms? Some researchers have found that removing nitrogen and inorganic