

tion of human suffering and indeed our very survival (Oza, 1981b).

The Governments 'owning' the tropical rain-forests owe an obligation for their conservation to the peoples of the world. Consequently, their actions should judiciously pave the way for sound resource-conservation strategies. Deliberate destruction of these forests, for immediate economic gain, will make the younger generations witness in increasing array the evils of soil erosion, desertification, human miseries, floods, food hunger, wood hunger, and unpredictable global climatic conditions (Oza, 1981c). Do we really seek to be deprived of vital forest products, life-saving drugs, fruits and timber, for ever? Ironically enough, the very forests which provided peace and prosperity to the world communities are in a helpless state before the destructive hands of Man, and one can almost hear them pleading to be left alone.

It is sadly overdue that, despite the adverse calamities now widely faced by human beings, Man has not yet come to realize at all widely that he is an integral part of Nature, and that human survival is dependent upon the conservation of forest trees and the rational use of the living resources of the Earth. If only Man would realize these fundamental truths and act accordingly, sustainable development should follow.

By the year 2000, the world's human population is projected to increase to around 6,000 millions from the present estimated 4,500 millions. If the population count is to grow by another third in that time, tragically most of the remaining tropical forests will be greedily axed down. Nor will the lost forest wealth be brought back to life overnight; it will take decades and perhaps centuries. Saving The Biosphere, we can hope to slow down the degrading trend of the living resources, which undisputably are the basis of human well-being.

Having now released the present set of stickers, linking trees with The Biosphere, we feel just a little more optimistic about getting a positive response towards saving some of the remaining tropical forests for posterity and, with them, habitats for our animal wildlife and of course human survival. Moreover, the thirsty populations seeking potable water should benefit from the water catchment areas.

The stickers are available, against a donation, to serve the cause of the *World Campaign for The Biosphere*. Please extend your generous support to the Conservation Movement through communicating with such a 'Save our Biosphere' sticker distributor as Dr J.R. Vallentyne, President, Canadian Society of Environmental Biologists, c/o Canada Centre for Inland Waters, P.O. Box 5050, Burlington, Ontario, L7R 4A6, Canada (Vallentyne, 1982), or with the General Secretary of INSONA (address below).

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Acid Precipitation: Can Europe Use the Answer?

Why are some 20,000 Scandinavian lakes devoid of fish? Why are trains in some areas of Poland limited to a speed of 40 km an hour? Why have 1,500 hectares of evergreen forest in Bavaria died—and why are another 80,000 ha threatened? And why are the Parthenon, the Acropolis, and Cologne Cathedral, slowly 'dissolving away'?

The answer seems to lie in acid rain—a pollution problem which has been growing in Europe since the early 1960s*, and may become a major source of international dispute in the 1980s. Rain, snow and other forms of atmospheric precipitation, are rendered acidic by oxides of sulphur and nitrogen, which are released to the open air particularly when fossil fuels—such as oil, coal, and natural gas—are burnt e. g. in power-stations and other industrial plants without due control.

Efforts to disperse local pollution from factories have made the acid deposition problem increasingly international—chimneys 200–300 metres high disperse pollutants into the atmosphere in which the gases may then be carried for thousands of kilometres by the prevailing winds in only a few days.

The oxides combine with water molecules in the atmosphere to form acids, and ultimately fall to the ground or water surface in rain, snow, or hail, etc.

The effects on lakes and other water-bodies are the best-documented; as lakes acidify, more-and-more forms of life in them find survival difficult and ultimately impossible. Some lakes—in particular those situated over limestone or other basic rocks—can 'buffer' the acidic deposition, so reducing its effect. But other lakes, etc., such as many in Scandinavia and parts of North America, turn into something resembling dilute vinegar.

*It has also long been increasingly serious in eastern North America—and latterly in western North America, according to a paper which we now have under consideration for early publication.—Ed.

As well as having these direct ill-effects, the acids can also cause damage indirectly. For example, acid rain leaches aluminium from some soils which then runs into lakes and streams, where it can be highly toxic. Similarly, such heavy-metals as mercury, cadmium, manganese, and lead, are rendered far more toxic by acid than neutral or basic water. Acidity encourages the formation of compounds in which organic molecules and heavy-metals have combined chemically, producing substances which are highly toxic to most forms of aquatic life. As the most sensitive creatures die, so do other life-forms which depend on them for food. In the end the whole ecology of the lake is altered.

Acid precipitation also produces direct ill-effects on buildings and other structures—the railway lines in the Katowice area of Poland have become so corroded by it that strict speed-limits have to be enforced. Stone buildings eventually begin to crumble and disintegrate, and paint-work blisters. The economic effects of the corrosion caused by sulphur and nitrogen oxides have been estimated at thousands of millions of dollars a year.

The effects on forestry are more controversial, and in spite of many studies scientists do not agree on exactly how acid rain affects forests. However, the role of aluminium and heavy-metals is suspected. In addition, acid rain may damage forests by leaching out other metals, such as magnesium and calcium, which are essential for forest growth.

Finally, acidity brought in precipitation is beginning to percolate through to ground-water reserves. Thus for example a survey on Sweden's west coast recently found that 49% of drinking wells were acidic—causing corrosion in pipes, foul-tasting water, and diarrhoea.

The acid precipitation situation is already critical in several respects and, as more and more countries turn to increased uses of coal for electricity production, there is a very real danger that things could worsen drastically. Only energy conservation and the application of known sulphur-pollution prevention technologies at new coal-fired power-stations seem likely to prevent acid rain from becoming a major ecological catastrophe.

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Winston Churchill Travelling Fellowships

Next year about one hundred fortunate people will be given the opportunity to travel almost anywhere in the world they may wish. They will have to prove that their work and interests could benefit from experience overseas, and that also in other respects they would be suitable for the award of a Winston Churchill Travelling Fellowship.

There are no particular educational or professional qualifications needed for application, no age restrictions,

and all UK citizens are equally eligible. Churchill Fellows do, however, have to indicate how they propose to make use of their knowledge for the benefit of others on their return to the United Kingdom. The categories in which awards are offered for 1983 include emergency services of various kinds, natural history and conservation of local environment, and sewage, water, and flood-control, workers.

If you would like an application form and explanatory leaflet, just send your name and address on a postcard to:

Winston Churchill Memorial Trust
15 Queen's Gate Terrace
London SW7 5PR, England, UK.

The Journal of Arid Environments

A forum for multidisciplinary dialogue in the fields indicated by its title, the *Journal of Arid Environments* (published by Academic Press, London, England, UK) was launched in 1978 to provide an outlet for the publication of original scientific and technological research and, simultaneously, to publish comprehensive reviews that should be intelligible to advanced students, technologists, administrators, and research workers, whatever their specializations and disciplines.

There is no single answer to the problems of the arid regions: these result mainly from increasing human populations, overgrazing by domestic stock, salinization, the felling of trees for firewood, and soil erosion. The wisest solutions vary according to local circumstances, including the cultural and religious attitudes of the indigenous peoples. Although science may point the way in which development can best proceed, administrators often have little idea either of the knowledge currently available or of how to apply it. The *Journal* provides an authoritative work of reference presenting new ideas, scientific facts, and guidance in how to apply them. Book reviews and technical notes increase the number of topics covered, and help to maintain a broad approach.

The ecosystems of arid environments are fragile and vulnerable to misuse. Social and geographical studies are, therefore, of more than mere academic interest. They illustrate the causes of desert expansion and indicate ways in which arid zones may be developed for the benefit of their inhabitants without engendering environmental deterioration. The solutions to social and economic problems can sometimes be simpler than is generally realized. For instance, one recent article drew attention to the fact that it might be more profitable to invest resources in the production of better-quality stock, which would be able to withstand a heavy trypanosome infection, than to spend the same amount of money and effort in attempting to achieve improved control of tsetse-flies (*Glossina* spp.), vectors of African sleeping-sickness and 'nagana' of horses and cattle.

Other recent contributions outline methods of managing finite groundwater supplies, or deal with Islamic water laws and oasis settlement, nomadism and pastoralism, wildlife conservation and land-use, the production of energy from salt and from solar radiation, weather modification, and remote-sensing from satellites.

The world's arid biomes are among the most inhospitable of all terrestrial environments. The adaptations of

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