Letting the bald patches show

Frederick Urbach

Ozone Depletion: Health and Environmental Consequences. Edited by Robin Russell Jones and Tom Wigley. *Wiley: 1989. Pp.280. £35, $72.*

IN THE spring of 1971, it was suggested that the exhaust gases of a future fleet of supersonic aircraft might have an effect on stratospheric ozone content. It was thought that such an effect would be caused by water and nitrogen oxides emitted as combustion products of aircraft engines operating in the stratosphere. In 1974, Molina and Rowland suggested that ozone would be destroyed by catalysis of chlorine atoms and that the main anthropogenic source of chlorine atoms could be chlorofluoromethanes. In the next decade, much laboratory and field research strengthened this supposition and led to heightened public awareness of the dangers of increased ultraviolet radiation on living organisms — including, of course, humans.

The springtime decreases of stratospheric ozone over Antarctica reported by the British Antarctic Survey, beginning in 1975 and intensifying thereafter, led to a concerted international research effort in 1987 which, for the first time, clearly demonstrated that chlorofluorocarbon (CFC)-derived chlorine atoms are one of the chief causes of ozone destruction. This volume represents the edited proceedings of a conference held in London in November 1988, at which scientific and medical authorities as well as politicians and environmental activists addressed a wide range of subjects: ozone depletion, global warming, international controls, ultraviolet-induced carcinogenesis, global consequences and political aspects.

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This satellite map, compiled from data obtained by the Nimbus-7 weather satellite, shows the severe ozone depletion over Antarctica (2 October 1987). The ozone 'hole' is the central white outlined area. Australia, southern Africa and part of South America are also outlined.

The resulting book provides an overview of our knowledge of stratospheric ozone chemistry and the sources of active molecular species acting as catalysts in ozone destruction. The problems of modelling stratospheric ozone perturbation and of estimating changes far into the future are difficult ones. There is agreement that ozone will decrease in the stratosphere and increase in the troposphere, and that long-term, continuous calibrated datasets are needed to understand global-scale changes.

The rationale for discussing global warming in this context is that the CFCs implicated in ozone reduction are also potent greenhouse gases, estimated to cause 15–20 per cent of the expected warming. Furthermore, changes in atmospheric temperature may lessen the effect of CFCs on ozone. It is difficult to derive models projecting the degree of future warming because the variables, such as the effect of oceanic thermal inertia are unknown — but everyone agrees that warming is to be expected.

The political ramifications of international controls of greenhouse gases, including CFCs and halons, are global, because control can be effective only if all the main producers and consumers are involved. A significant beginning has been made with the Vienna convention in 1985 and the Montreal protocol in 1987. But in view of more recent observations, attempts should be made to speed up implementation of these agreements.

One of the main potential problems to humans of increased ultraviolet radiation is the increase in skin cancers via damage to DNA, which if misrepaired can cause skin-cell carcinogenesis. Ozone depletion in the stratosphere could seriously increase the incidence of malignant melanoma, the most dangerous type of skin cancer, but details of this relationship are not yet clear. Other potential consequences of ozone decrease are the effects on terrestrial plants and marine organisms. Effects on the food chain are serious, but the confidence and precision of estimates vary greatly. Considerable research is needed to understand these relationships.

Some contributors to this volume present impassioned pleas for the development of alternatives to CFCs, but others stress the enormous technical and economic costs involved. The book contains reasoned and realistic views both of concern for environmental problems and of the difficulty of having nations act in concert. The scientific sections are excellent and up to date, providing a brief but reasonable review of the state of the art in 1988. □

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Corrections

■ In Stuart Sutherland's review of *Microcognition* by Andy Clark (*Nature* **344**, 207; 15 March 1990), the title of the book was misspelled.

■ *Primate Origins and Evolution* by R. D. Martin, reviewed by Jonathan Marks in *Nature* **344**, 205; 15 March 1990, is published in the United States by Princeton University Press.

■ In his review (*Nature* **344**, 301; 22 March 1990) of *A Shield in Space?* by S. Lakoff and H. F. York, Richard Garwin cited a two-year-old estimate of $20,000 for the cost of a 'brilliant pebble'. This figure should have been $50,000 per unlaunched pebble and $25,000–$50,000 for launch into orbit. Thus the unlaunched cost estimate of a brilliant pebble has changed from $50,000 two years ago to $1.1 million–$1.4 million today. □