BOOK REVIEW

Richard C. J. Somerville: 1998, *The Forgiving Air. Understanding Environmental Change*, University of California Press, 195 pp., ISBN 0-643-05688-2.

With apologies to Tolstoy, it has always seemed to me that all good books are alike, while bad books are usually bad in some distinctively detestable way. Good books are *about* something important that's worth reading about. Good books give the reader valuable truths about their object of concern. And good books tell their stories in the individual and authentic voice of their authors.

Richard Somerville's extremely good book passes these tests with flying colors. As its somewhat enigmatic title suggests, the book deals with the changing global environment that supports our life – more particularly the thin layer of restless air in which we swim. In her poem from which the book's title derives, Elizabeth Bishop sees the seasonal cycles of the 'forgiving air' as an ever-changing, ever-renewing background to the cycles of life. Somerville, however, focuses on the damages that humans are inflicting on the atmosphere – with the implication that the air may not be so 'forgiving' after all, that human influences are overwhelming nature's cycles. As will be no surprise to those who know him, Somerville's account is characterized throughout by enviable lucidity, impeccable accuracy and balance, and unimpeachable authority. Finally, and most delightfully, to read the book is to sit in a comfortable chair by a comforting fire, listening to the wise and earnest conversation of a learned friend. Somerville has a distinctive voice, and it's worth listening to. *The Forgiving Air* is a good book by a good man.

Somerville's extended 'fireside chat' centers on three atmospheric issues of current concern – ozone depletion, changes in the greenhouse effect, and tropospheric air pollution. The broad outlines of these problems are surely so familiar to readers of this journal that summarization would be superfluous. The one ozone molecule in each million companions of other species lying above us gallantly fends off most of the sun's ultraviolet invaders before they can mess around with our DNA. But long-lived chlorofluorocarbons, wonderfully useful in their place, traitorously catalyze the destruction of our ozone defenders. More numerous carbon dioxide molecules industriously bustle through air and ocean, pausing in plants and creatures like us to fuel the processes of life. Their numbers are also increasing because of fossil fuel combustion, enhancing the earth's blanketing 'greenhouse' and slowly changing global climate. Other human effluents – mostly also associated with combustion – combine to produce smog and acidic precipitation.

Although the actors are distinct, the plots of these stories are in essence the same: By excreting waste products of our burgeoning civilization into the shallow film of atmosphere in which we swim, we humans are making small but increas-

ingly bothersome changes in the chemistry of the atmosphere. As a species we are thus exhibiting behavior that would cause us as individuals to be ejected forcibly from even the most lackadaisically managed neighborhood swimming pool. Parenthetically, it has always seemed strange to this reviewer that control of excretions is one of the first things learned by humans as individuals, and among the last things learned by human communities!

Somerville is of course too well bred to employ such crude analogies (after all, he grew up in the more upscale districts of the reviewer's own neighborhood!). Nevertheless, he tells the stories of these insults to the 'forgiving air' with masterly skill and a refreshing degree of quantitative precision. Although rigorously observing a self-imposed ban on equations, and carefully steering clear of esoteric jargon, he never ducks essential complexities. Indeed, every few pages the reader is presented with a masterful short course in one or another branch of meteorology. When the problem is ozone depletion, a vitamin capsule of radiation theory, chemistry, and stratospheric dynamics is administered, together with a refreshing draught of the fascinating history of chlorofluorocarbon discovery. In the two dozen pages on greenhouse warming, an infusion of carbon cycle, heat budget, statistical detection, and politics is provided. Since the essence of the problem is the prediction of future climates, Somerville segues into a virtuoso treatment of the general problem of weather prediction, including both Richardson's brave and seminal attempts and Lorenz's elucidation of chaos and predictability. Consideration of air pollution leads to a deeper discussion of atmospheric radiation, an outline of the general circulation, and a nice summary of synoptic meteorology. One is reminded of the technique of administering medicines to puppies – embed the pill in a tasty chunk of hamburger!

Having outlined the problems and the underlying science, Somerville turns to causes and solutions. He sees their genesis in the familiar triad of population, affluence, and technology. No simple recipe is advanced, but the general directions of his thought emerge clearly enough – population constraint, efficiency improvements, safeguarding of nature, and improvements in technology to make these possible. In all, he is cautiously optimistic '. . . about the chances of real progress toward a sustainable future; there's considerable evidence that a massive change in attitudes and policies, which was once unthinkable, may be coming to the fore today'.

Somerville concludes this fine book with a brief chapter 'On Scientists and Doing Science', a chapter that should be faxed to every Member of Congress. He begins with the obvious – 'You can't make a sensible decision . . . if you don't have an understanding of the consequences of actions . . .' This understanding of the links between actions and consequences comes of course from science. But the understanding needed to deal with today's problems necessarily has its roots in yesterday's science, carried out by yesterday's scientists motivated by yesterday's reasons. Keeling did not study atmospheric carbon dioxide so that we could decide on carbon taxes. Rowland did not study chlorofluorocarbons so that diplomats in Montreal could negotiate a treaty. The scientists of the past could not predict

what their science would be good for, to what problems it would be applied. Neither can the scientists of today predict how their work will be utilized in the decades to come. Still less can the politicians of today rationally decide which pieces of today's science should be fed, which starved, in order to address tomorrow's problems most effectively. 'In that way, science is inefficient', Somerville concludes.

Reviewers are charged with finding faults as well as virtues. Few of the former can be cited in this excellent volume. Those seeking an orderly and comprehensive textbook will be disappointed. Technical background information is presented as conversational asides to discussions of the principal issues, leading to some duplication and perhaps confusion. The author's determination to avoid equations and scientific jargon may prove more hindrance than help to some readers. In any event, it's a hard posture to maintain – explaining ozone depletion required half a dozen things that look like equations to this reviewer's eyes!

Perhaps more seriously, the narrow focus on the atmosphere-centered aspects of global environmental change may lead the reader to conclude that other facets of the syndrome are less important. Problems such as land-use changes, biodiversity loss, and declining water quality are briefly noted, but there is little to indicate their importance relative to atmospheric changes.

A regrettable omission, explicable either by the 1996 copyright date or perhaps by the author's good manners, is the lack of any discussion of the industry-financed anti-environmental backlash of recent years. As outlined by Ross Gelbspan in his recent exposé, *The Heat is On*, a massive and lavishly financed disinformation campaign has managed to depict in the media and in the public mind the rigorous science that Somerville presents as speculative theoretical musings. Thus, for example, all newspaper stories about greenhouse warming begin by saying that '*many* scientists believe . . .' Stories about ozone speak of substances that 'are *believed* to affect the ozone layer'. Somerville's eloquent exposition of the generation of scientific information could well have been accompanied by a discussion of the contemporary processes of disinformation.

All good books are alike, finally, in being difficult to review – at least to review interestingly. Virtue is always admirable, but rarely interesting. *The Forgiving Air* is something of an exception to this rule. Anyone at all concerned about the future of the air we breathe and the planet we inhabit will find both illumination and enjoyment from a few hours of reasoned conversation with its pages.

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