Chemistry of Atmosphere. P. S. Sindhu. New Age International Publishers, 4835/24, Ansari Road, Daryaganj, New Delhi 110 002. 1998. 315 pp. Price: Rs 595.

The importance of atmospheric chemistry cannot be over emphasized. The 1995 Nobel Prize in Chemistry was awarded to Profs. Paul J. Crutzen (Max-Planck Institute for Chemistry, Germany), F. Sherwood Rowland (University of California, Irvine) and Mario J. Molina (Massachusetts Institute of Technology) for their contributions to studies on stratospheric ozone depletion. Atmospheric chemistry is, of course, a lot more than the stratospheric ozone. Atmospheric scientists worry about global warming due to greenhouse effect, acid rain, photochemical smog and air pollution, to name a few more topics. Each one of them is an extremely complex subject in itself, with kinetics, photochemistry, spectroscopy, flow dynamics, mixing, transport, heterogeneous chemistry, etc., all playing vital roles. According to the cover story in a recent *Chemical and Engineering News*[1], average global temperature in 1998 was higher than what it has been for the last 1000 years, most likely due to raise in CO_2 emissions! It is, indeed, very important to include Atmospheric Chemistry in the curriculum for chemistry students at the U.G. and/or P.G. level. Naturally, when I saw the book under review, I was happy. The Table of Contents listed all the topics given above and more. I started reading the book enthusiastically. However, my happiness and enthusiasm were short lived for this book is full of typographical, grammatical, factual and conceptual errors. It has incomplete, repeated, contradicting and absurd sentences. Listing out all these errors would be exhausting. However, a few representative ones should be pointed out so that the readers realize how casual/careless the author and publisher have been in bringing out this book.

The page before the Table of Contents says 'In the following cases, parts or all of the material used was (based) on the work cited with permission of publishers/authors'. Nothing follows this sentence in the book but a blank page. Part of the very first sentence in the book reads 'evolution of earth book place'. This unit for second order rate constant is printed in so many ways throughout the book: cm^3 $molecule^{-1}$ s^{-1} (correct one), cm^2 $molecule^{-1}$ s^{-1}, cm^{-3}, $molecule^{-1}$ s^{-1}, cm^{-3} molecule s^{-1}, molecule cm^{-3} s^{-1}, cm^3 $molecule^{-1}$ S^{-1} (I may have missed out a few). For a forbidden transition, the book reads 'J = 0 → J = 0; → means cannot combine with'. Obviously, the author wanted to use a symbol like –/→, which is used elsewhere in the book. Table 4.3 has all doublet configurations listed for singlet energy states. Reactions 7.5 and 7.8 are identical. Reaction number 5.2 is given to two different reactions. Troposphere has four different spellings. Alexander Graham Bell's name is misspelled as Bel when explaining the unit decibel which of course, has one '1'. There is not a single page in the book without some error or other!

The author states on page 79 'Reactions 4.3, 4.4, 4.16 and 4.17 together lead to formation of ozone.' These reactions are reproduced below, wavelength corresponding to the absorbed light.

$$O_2\,(X, {}^3\Sigma_g^-) + 147\ nm \rightarrow O_2\,(B, {}^3\Sigma_u^-) \rightarrow O\,({}^3P_2) + O({}^1D_2) \quad (4.3)$$

This reaction does not have a number in the book. As this is the only reaction between 4.2 and 4.4, I assume the author is referring to this reaction. But, may be he means (4.1) when he says 4.3.

$$O_2(X, {}^3\Sigma_g^-) + 200\ nm \rightarrow O_2(A, {}^3\Sigma_u^+) \rightarrow 2O({}^3P_2) \quad (4.1)$$

$$O_2(X, {}^3\Sigma_g^-) + < 130\ nm \rightarrow O({}^3P_2) + O({}^1S_0) \quad (4.4)$$

$$O({}^3P_2) + O_2(X, {}^3\Sigma_g^-) + M \rightarrow O_3 + M \quad (4.16)$$

$$O_3 + h\nu \rightarrow O({}^3P_2) + O_2(X, {}^3\Sigma_g^-) \quad (4.17)$$

He goes on to say 'Reaction 4.17, however, does not destroy ozone as it (what?) recombines immediately according to Equation 4.16. If there were no other reactions than these four reactions, it can be conceived that eventually all atmospheric oxygen would had been converted into ozone and whole life would have been wipped out' (spelling and grammar mistakes are from the book). Reactions 4.3 and 4.4 are not needed for ozone formation. It turns out that Reactions 4.1, 4.16 and 4.17 along with

$$O_3 + O \rightarrow 2O_2$$

constitute the Chapman mechanism, which the author discusses in Chapter 5. These four reactions imply that O, O_2 and O_3 will all be existing in equilibrium unlike what the author conceives, rather dramatically. The Chapman mechanism, however, predicted ozone concentration much higher than the experimentally measured value. Then came the 'search' for ozone destroying species in the atmosphere leading to the 1995 Nobel Prize. Of course, the search and research continue today. Very recently, Crutzen and Lawrence have pointed out the importance of including NO emission from ship, in modeling the ozone balance[2]. They claim that the ocean-going ships may account for more than 10% of global NO_x production from fossil fuels, too large to have been ignored all these days! Also, recently scientists at the National Institute of Water and Atmospheric Research in New Zealand have documented a strong link between decreasing ozone levels and increase in UV[3].

It appears to the reviewer that the author and publisher should recall all the copies from the dealers and stockists. The author happens to be the President of VATAVARAN, a non-government organization, working for a pollution-free environment. Surely he has great concern for the environment and he feels the need to educate students and others about the importance of atmospheric chemistry. Careful rewriting and proof reading can make it a valuable book. It covers all the topics that should be covered in such a book except, perhaps, for a discussion about polar stratospheric clouds (PSC). These PSCs have been identified as the primary cause of the Antarctic ozone hole[4]. The chapters on air pollution control and air pollution in India are important for everyone. While the same is true for the chapter on noise pollution, one wonders what does it have to do with atmospheric chemistry? Though several excellent books[5–7] on atmospheric chemistry are available in the Interna-

tional market, an Indian book that is affordable to most readers would be very welcome. Unfortunately *this* book, as it is printed now, will not serve that purpose.

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2. Lawrence, M. G. and Crutzen, P. J., *Nature*, 1999, **402**, 167.
3. McKenzie, R. *et al.*, *Science*, 1999, **285**, 1709.
4. Sherwood Rowland, F., *Annu. Rev. Phys. Chem.*, 1991, **42**, 731; Johnston, H. S., *Annu. Rev. Phys. Chem.*, 1992, **43**, 1; Zondlo, M. A. *et al.*, *J. Phys. Chem.*, 1998, **102**, 5735.
5. Warnaeek, P., *Chemistry of Natural Atmosphere*, Academic Press, San Diego, 1988.
6. Wayne, R. P., *Chemistry of Atmospheres*, Clarendon Press, London, 1985.
7. McEwan, M. J. and Phillips, L. F., *Chemistry of the Atmosphere*, Edward Arnold, London, 1975.

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Advances in Pharmacological Sciences. Radioactive Isotopes in Clinical Medicine and Research XXII. H. Bergman, A. Kross and H. Sinzinger (eds). Birkhauser Verlag. AG, P.O. Box 133, CH-4010. Basel, Switzerland. 1997. 552 pp. Price: SFr 188/DM 228.

Badgastein is one of the three little villages in the Gastein valley in Salzburg province in Austria. Scientists, engaged in the application of radioisotopes in human health, meet in Badgastein once every year since 1975, discuss and exchange their ideas and views; hence the term *Badgastein symposium*. Scientists, mostly from Europe and United States of America, attend these symposia. This book is a compilation of the proceedings of the 22nd Badgastein symposium.

A variety of topics in nuclear medicine – a branch of medicine which deals with the application of radioisotopes in the diagnosis, treatment, and study of human disease – are presented in this book. Topics range from nuclear cardiology, neurology, oncology, physics, pharmacology, immunology and therapy. The texts include manuscripts of oral and poster presentations made in the symposium by various authors and are arranged on the basis of the scientific issue addressed in the presentation. This enables easy access to the topics in which the reader is interested. The editors have made no attempts to change the format of the texts of the presentations; they remain as the same in the original manuscripts.

The scientific presentations deal with the most current issues in the respective fields of study; be it cancer or cardiac diseases, physics or pharmacology or therapeutic application of radioisotopes. They, in most cases, focus on a very specific issue in that field. As the issues are current they are open to discussion and criticism; await approval and consensus by the scientific community through further studies. Thus this is not a textbook of nuclear medicine in the usual sense.

Nuclear medicine has come a long way in the half century of its existence. The core strength of nuclear medicine – tracer technology – gives it a higher degree of sensitivity to detect disturbance of body functions in diseases. However it lacked the required specificity. But the introduction of biomolecules and their analogues, which can be labelled with appropriate radioisotopes, the specificity has also improved significantly. It is now possible to identify the etiology of inflammatory process in the body; bacterial, using radiolabelled antibiotics (Tc99m labelled Ciprofloxacin), autoimmune using labelled interleukins (I 123 labelled IL2 R). Tissue diagnosis of cancer is possible *in vivo* as in the case of Somatostatin receptor scintigraphy in the diagnosis of large meningiomas.

Advances in imaging techniques have improved the detection of foci of abnormal or disturbed function. Planar imaging could detect only foci the size of a few centimeters. With the advent of Single Photon Emission Tomography (SPET) and Positron Emission Tomography (PET), the size of detectable lesion has been reduced to a few millimeters. In addition, co-registration of images from SPET or PET and from CT or MRI has significantly improved the accuracy of localization of the foci of abnormal function.

When nuclear medicine techniques armed with these latest attributes, i.e. high sensitivity and high specificity are applied to the diagnosis and treatment of various diseases, it is possible to obtain information that make the management of patients rational and decisive. Similarly when nuclear medicine techniques are applied to the study of body functions in health and disease, it can provide valuable insight into the pathophysiology of various disorders and diseases.

This book is not to be used as a textbook in nuclear medicine. It is a good source of reference for those who are actively engaged in research in nuclear medicine, as it takes one to the cutting edge of research in the given field of study. The authors of various articles are responsible for the conclusions drawn from their respective studies. The editors have not exercised any of their rights. They have simply grouped the various papers together based on the medical issue addressed in them. The reader will not see what is usually expected in a textbook such as standardized format of the contents, editorial efforts to guide the language and syntax and a free flowing arrangement of the theme.

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