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Hobbs, P.V.: Basic Physical Chemistry for the Atmospheric Sciences. 2nd Edition. – University Press, Cambridge, UK, 2000. 209 pp., P/B £ 15.95. ISBN 0-521-78567-7. H/C £ 42.50. ISBN 0-521-78083-7.

"The best thing for being sad," replied Merlin, beginning to puff and blow, "is to learn something. That's the only thing that never fails. You may grow old and trembling in your anatomies, you may lie awake at night listening to the disorder of your veins, you may miss your only love, you may see the world about you devastated by evil lunatics, or know your honour trampled in the sewers of baser minds. There is only one thing for it then – to learn. Learn why the world wags and what wags it. That is the only thing which the mind can never exhaust, never alienate, never be tortured by, never fear or distrust, and never dream of regretting. Learning is the only thing for you. Look what a lot of things there are to learn." (T.H. White, "The Once and Future King")

Basic Physical Chemistry hints through its title (basic!) at being understandable and requiring few knowledge to get started. That it is intended for the atmospheric sciences is another hallmark, in other words the title stands out from larger works (e.g. ATKINS, Physical Chemistry, an intimidatingly large book with an all encompassing and monoconceptual title to begin with). In other words, it is a book for the beginner and those others (see above) on the eternal quest for information, knowledge and, finally, wisdom to decide.

Peter HOBBS is professor of atmospheric science at the University of Washington. He started the first edition of this book in 1984 as Alexander von Humboldt Foundation Senior Scientist in Germany and finished it in 1993 at a sabbatical at the Instituto FISBAT in Bologna, Italy.

The book has seven chapters. The first three deal with chemical eqilibrium, thermodynamics and kinetics. Beginning with the concept of reactions and a means to determine their progress (reaction quotient and equilibria) the first chapter ends with the principle of LECHATELIER. After this easy walk a review of the three laws of thermodynamics is given together with free energy changes and chemical potential. The zeroth law is missing, however, it is rarely mentioned as it is sort of natural (two systems in thermal equilibrium with a third are among themselves in thermal equilibrium). As with all chapters, there are calculated examples and questions at the end of each chapter, most with solutions given in the appendix. One example describes nicely the existence of supersaturation of water vapour with fine droplets - not only important in cloud physics but also in the description of the generation of aerosols around Aitken nuclei. In the third chapter the dimension of time is introduced with the rate of conversion in chemical kinetics accompanied by some collision theory.

The fourth chapter is about solution chemistry and aqueous equilibria. Here the going is markedly steeper but many examples guide the reader to see e.g. why rivers should not be heated by industries (oxygen saturation) and how instant ice packs work (Ammonium nitrate dissolved in water).

Chapter six covers acids and bases to be followed in chapter seven by oxidation-reduction reactions. Here the going is somewhat erratic, i.e. a lot of material is presented but the connection to the atmosphere is more indirect. The example of calculating the ph of rain water in presence of carbon dioxide, however, is an obvious link to the atmosphere as is one of the problems concerning the range of ph values of cloud water over oceans. Other problems familiarize the reader with the many metal ions present in polluted air or touch the general equation for photosynthesis in plants.

The last chapter is about photochemistry. After the necessary introduction of the physics the photostationary state between NO, NO2 and ozone is given. In a brief outlook on tropospheric ozone the governing role of some volatile organic compounds in providing an oxidation pathway for NO is missing. A rather large part of this chapter, in fact the largest single topic in this book, is devoted to the depletion of stratospheric ozone. This topic provides a fruitful combination of gas phase chemistry, solution chemistry (particles in polar stratospheric clouds). Why the ozone hole is so deep at the antarctic and not also on the arctic is only explained with the term meteorological conditions. It seems to me, that already at the time of the first edition one of the reasons was known – the formation of a stable vortex in the antarctic stratosphere, trapping the air masses and thus increasing the reactions without dilution of fresh air. In the arctic both the (thermal) contribution of land and sea prevent the stable stratospheric vortex.

The appendix (22 of 209 pages) gives data for the exercises and solutions to the problems, the index (22 of 209 pages) is clear and sufficient.

This second edition is an updated revision from the first edition in 1995. The updates are few and a cursory comparison of both editions did not show changes in the text. The book could gain by providing some historic background, inclusion of newer results and by providing hints to further literature (no references are given). However, these are the bickering comments of the critic - and their realization would take away the good readability and destroy the impression of manageability (i.e. just read this book and you will know) and add lots of weight. The style of the manuscript is clear, print quality is high and, possibly, slightly higher in the revised edition. The solved problems are a sine qua non in understanding the topics and provide also some insights to the cursory reader. Intended reading audience are undergraduate and graduate students in atmospheric sci-

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