To the Reader:

It is truly a great privilege to share this with you. For over twenty years, St. Olaf College has had a unique second semester of first-year chemistry. We have set our standard introductory chemistry textbook aside for about seven weeks to take a really close “behind-the-scenes” look at what makes molecules do what they do. We have done this for three reasons. First, our second semester of first-year chemistry at St. Olaf College is designed to fill part of a department accreditation requirement for a first semester of physical chemistry. Second, we firmly believe that it is possible for first-year students to learn the basics of physical chemistry at a level appropriate to a first-year course. Third, we are convinced that having these discussions with first-year students, many of whom will never take another chemistry course, is one of the greatest services we can provide those students. The trick, we believe, is to have an understanding faculty and the right tools.

To make this work, the tool we chose was an outstanding textbook by William Davies entitled Introduction to Chemical Thermodynamics: A Non-Calculus Approach. This textbook, long since out of print, has been critical to our success all these many years. The focus on intuition and the logical progression of ideas cannot be beat. To a large extent, the approach used by Davies has been used in this text as well.

However, over the years it has gotten harder and harder to teach from this textbook. Besides being out of print, “Davies” (as it is affectionately referred to around here) uses outdated conventions—$E$ for internal energy instead of $U$; calories instead of Joules, $-w$ instead of $+w$, extensive rearrangement of natural log terms when using the “ln” key on a calculator works just fine, the almost complete lack of real-world examples. The list goes on and on. Each year it has gotten more difficult to integrate this book into a modern teaching style.

Having returned from a wonderfully relaxing vacation in Colorado, during the last week of 1998, I decided something had to be done. I made a list of all the revisions needed and discussed these with colleagues George Hardgrove, Beth Abdella, Mary Walczak, and Susan Green. We all agreed that the time had come. None of us, mind you, thought it would mean a new book! Alas, being the one having interim off for once, I set to work. After two days I threw in the towel and gave up. It was just too hard a job sifting through all the various issues and trying to come up with solutions that fit 3 inches of space here, 2 there. Then something magical happened. The words just flowed, and my fingers couldn’t stop typing.

The result of this adventure was a first draft, which was well received, despite its hasty production, by 198 students and three faculty during the Spring of 1999. A second draft followed in the Spring of 2000. This second draft incorporated suggestions made in over 400 chapter reviews written by students at the end of that first semester of use. We were very pleased to see that, mostly, students found the casual style welcome and much more readable than what they were used to in first-year texts. In almost every case, we were able to respond creatively and positively to these mostly constructive suggestions. The second draft was better organize and better cross-referenced, and it included almost 100 more pages of text, 200 homework problems, and an almost completely new set of figures. Appendix I was as HUGE success, and it was expanded to include cross references to chapter sections. Major revisions in that second draft included an expanded section in Chapter 3 focusing on chemical reactions, moving of the discussion of the pressure effect on entropy forward two chapters, refocusing the chapter on pressure effect on free energy as a discussion of the equilibrium constant, a complete rewrite of Chapter 12 (phase changes), and a new appendix showing data for the vaporization of water.

Primarily, this third draft adds an index and corrects several minor typographical errors. The job isn’t finished yet. We are aware of the immensity of Chapter 3, in particular, and are very interested in any and all suggestions as to how it can be made more manageable. We have heard the feedback that the worked problems in the chapters, integrated as they are with the text, are not always easy to find when it comes to homework time. We continue to strive for the best possible book. Please let us know how to improve it!

Bob Hanson, January 3, 2003
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