decided—reluctantly—to do it himself. As he finished chapters, they were used in the Juniata classes. He started out about six chapters ahead of the students, but by the end of the year, he was only about two chapters ahead. "I had to stay enough ahead of the class that they would have something to read as they went to the next chapter," Reingold says.

He managed to find a publisher—Houghton Mifflin—willing to risk publishing a book without a built-in market. The publisher "understood the concept of organic first," he says. "They knew exactly what they were getting into and how risky it was. They were willing to take the risk and hope that this kind of approach to teaching would catch on and we'd be on the front of the wave." The company paid Reingold to provide camera-ready copy.

Whereas the Ball and Reingold books are completely new, the other two textbooks—"Principles of Biochemistry with a Human Focus" by Reginald H. Garrett and Charles M. Grisham of the University of Virginia and "Chemistry: The Molecular Science" by John W. Moore of the University of Wisconsin, Madison, Conrad L. Stanitski of the University of Central Arkansas, and Peter C. Jurs of Pennsylvania State University—have their roots in previous textbooks.

Garrett and Grisham had written a biochemistry textbook that was published in 1994. Like many biochemistry textbooks, it's large, tipping the scales at 1,200 pages. After it came out, their publisher told them that there were markets the book wasn't capturing, especially those for one-semester courses and medical schools. "As an author, you feel like you've let somebody down if your book doesn't suit their needs," Grisham says. "It's as if you're prevented from interacting with them for some fundamental reason that's upsetting."

They decided they would write a shorter, less quantitative book. They also decided that they would take a human focus to make the book more interesting to students and more attractive to the medical school market. "Instead of talking about things that might be considered bacterial metabolism, we instead talk about the human equivalent of some of these proteins and enzyme systems," Garrett says. In addition to such changes in the main text, they also covered human biochemistry through focused essays.

In writing their "Principles" book, Garrett and Grisham faced the daunting task of figuring out how to cut about a third of the material from what they have dubbed the "big book." At the same time, they needed to determine how they would organize it differently. "We wanted to bring in all the excitement now present with regard to human biochemistry and health and medicine," Garrett says.

Moore, Stanitski, and Jurs had the opposite problem—they had to decide what to add. The textbook that "Chemistry: The Molecular Science" was based on was shorter than the typical general chemistry textbook, with some topics purposely omitted. The new book "beefed up all those things that were missing," Jurs says. Although the book is new, Moore, who is also editor of the Journal of Chemical Education, points out that "in general chemistry, nothing's ever really different." His primary motivation was to try to make changes in pedagogy, he says.

One of the things the authors tried to do was get students "actively involved in dealing with the subject of a given chapter," Moore says. The authors especially emphasized conceptual—as opposed to numerical—problems that reinforce the students' understanding. Much of that grew out of an NSF-sponsored curriculum project called the New Traditions Project, in which conceptual materials and conceptual approaches to teaching were developed, Moore says. For example, each chapter ends with a summary problem that requires students to tie together the concepts they learned in the chapter in an application.

Another big change in the textbook was that the authors decided not to segregate organic chemistry and biochemistry from the rest of the content, Stanitski says. Where appropriate, they used organic and biological examples to illustrate concepts.