Foreword

Robert Karplus was my graduate advisor and mentor from 1968 to 1972 at the University of Calfornia, Berkeley. *Introductory Physics: A Model Approach* was just being published when I first met Karplus, and I assisted in teaching several courses based on the book. *Introductory Physics* made a very strong impression: there was Karplus' unique approach to physics, his brilliant insight, his clear, direct language, and his powerful teaching methods, all expressions of his joyful personality, creativity, and love of humanity. However, soon after I finished my Ph. D. and left Berkeley, the book went out of print. Karplus and his wife Elizabeth bought the rights back from the publisher in 1980, and he hoped to publish a second edition. But this was not to be, and he passed away in 1990.

Recently, Robert G. Fuller edited and published a wonderful collection of Karplus' work on science education, along with essays about him by many of his closest collaborators: *The Love of Discovery* (Kluwer Academic/Plenum Press, 2002). Reading the essays, especially the ones by Alan Friedman, Rita Peterson and Fuller, reminded me about how inspiring and influential Karplus was for me and for so many others. More pointedly, re-reading the two chapters of *Introductory Physics* included in the collection made me realize, even more than when I was in Berkeley, how unusual the book was and how valuable it still could be. I resolved to try to bring *Introductory Physics* back to life.

My initial thought was to reprint the 1969 edition of the book. But this would not really have been in Karplus' spirit. He would have wanted to fix errors and clarify the text wherever possible. At first, I hesitated to change anything, but I found that I could indeed distinguish what really needed change from the many valuable features that had to be preserved. This required a substantial effort – more than a year – but it has been a labor of love.

With the permission and encouragement of Elizabeth Karplus, I have edited *Introductory Physics*, and this second edition is published in memory of Robert Karplus.

Robert Karplus was a well-known physicist, physics teacher and science educator: Professor at UC Berkeley, Director of the Science Curriculum Improvement Study (SCIS), Director of Berkeley's Lawrence Hall of Science, President of the American Association of Physics Teachers, and a creative, prolific researcher in physics and science education. In addition, Karplus was a warm, generous person, a wonderful teacher, a terrific speaker, a passionate advocate for good science teaching, and a tireless campaigner for innovation and improvement in science education at all levels.

After more than ten years at the top echelon of theoretical physics research, Karplus became interested and then immersed in science education. His subsequent career spanned a unique period – the Post-Sputnik effort to improve understanding of science.

In this long effort, Karplus was a pioneer: he was one of the very first (possibly the first) leading scientists to focus on elementary science education, and he was instrumental in extending the national priorities, and funding, which focused first on the college level then on the secondary level and finally, after Karplus, on the elementary level. He realized the importance of Piaget's work very early, became a vocal expert on Piaget's ideas, and did significant original research on the reasoning process.

Karplus originated the Science Curriculum Improvement Study in 1963, and over the next 15 years, in collaboration with Herbert Thier and many others, he carried through a major national elementary-level curriculum reform effort. Karplus, Thier and SCIS brought good science (including hands-on investigations) into schools throughout the country and beyond. With a deep-seated belief in the values of public education and democracy, and a self-evident spirit of cooperation and goodwill, SCIS made a very significant contribution to elementary education in the US.

In fact, Karplus was one of the most effective and charismatic leaders in the many-faceted effort of the 1960s and 70s to develop science curricula, train teachers, carry out research, educate voters and political leaders, and generally upgrade the understanding and teaching of science throughout the US. While he is best known for his work on SCIS at the elementary level, Karplus taught physics regularly at Berkeley, he was active in the American Association of Physics Teachers, and he made many significant contributions to physics teaching at the college level. *Introductory Physics* is the fruit of these efforts.

A longer biography of Robert Karplus appears at the end of the book. I would like to express my gratitude to Elizabeth Karplus for her permission to revise and publish the book, and especially for her strong and nurturing encouragement along the way. I would also like to thank Empire State College (where I have taught since 1972), Donald S. Cook of the Bank Street College of Education, Alan Friedman of the New York Hall of Science, my wife Jennifer Herring, my publisher Timothy Johnson (a distinguished graduate of Empire State College), Harold Ohrbach of the New York Academy of Sciences, and the various individuals, publishers and organizations listed in the Acknowledgments for their permission to include illustrations, diagrams or photographs in the Second Edition.

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