Preface

This book was born from my lifetime of study of the scientific field of mechanics. I feel fortunate to have had a fulfilling career in such a challenging and enlightening field of study.

I was born in 1950 in the United States, the son of a World War II Army Air Corps veteran. My father was educated in Engineering at Cal Tech, and he was in every sense of the word an "engineering nerd." I was somehow endowed by him with sufficient talents to follow in his footsteps, thus I subsequently enrolled in Engineering in college, and over a 12-year span of time that included three and a half years in the U. S. Air Force, I obtained degrees in Aerospace Engineering (B.S.), Civil Engineering (M.E.), and Aerospace Engineering (Ph.D., focus on Engineering Mechanics) at Texas A&M University. Somewhat serendipitously, I also studied meteorology for a year in graduate school in preparation for my time in the Air Force as a weather forecaster. I would not realize until much later how important that experience would be to my understanding of mechanics. I have subsequently spent my entire career as a Professor (until recently), teaching at a number of universities both in the U.S. and abroad.

Now, as I look backwards in time, I find myself to have been exceedingly fulfilled by my professional career. Nonetheless, I feel the need to impart my take on the history of my discipline. I say "my take," because it would not be appropriate to call this text a history book. It is rather my own peculiar view of the universe, one predicated upon my experiences, which are admittedly biased by my long and somewhat narrowly focused view of my own field of study and its impact on the world. I must therefore apologize in advance to those who find error with, or worse, are offended by "my take." In some cases there are clearly enormous gaps in the history of mechanics found within the pages of this text. In other cases, I have chosen to discuss details that may seem insignificant to some readers. Such is the nature of each person's view of what is important to this subject. In that sense "my take" is surely highly idiosyncratic, but hopefully not offensive. For those who seek a more technical and in-depth coverage of the history of mechanics, I refer you to the excellent book entitled *A History of Mechanics*, by René Degas (Dover 1988).

I'm a big fan of Carl Sagan. I won't go into his life or his achievements, since through one of the miracles of modern science and technology you can simply Google his name and find out everything you ever wanted to know and more. But suffice it to say this—at the time that he was writing, Dr. Sagan brought the

wonders of science to more people than anyone else in the history of this planet. Yes, he was a brilliant scientist as well as a prolific author. And yes, he was taken from us far too soon (at the age of 62). But as far as I am concerned, it is his skill at making science accessible to so many that is his enduring legacy.

You may ask why I choose to elevate "showmanship" to such a lofty pedestal. No one can doubt that Carl Sagan was a showman, and a brilliant one at that. His New York accented way of saying "billions and billions" became a trademark phrase for a generation of Americans. It has even been whispered that Dr. Sagan was passed over for election to the National Academy of Science because his showmanship crossed over the boundaries of science. I will not dispute this conjecture.

What impresses me is what Dr. Sagan clearly knew, and what he was trying to do with that knowledge. I have learned so much from him. And this is what I learned—I learned the importance of education. I learned that education of our species is the driving force behind our success on this planet. I do not believe that I would have ever completely understood that fact had it not been for Carl Sagan. He not only understood it, he "put his money where his mouth was," so to speak. To be sure, he never stopped doing important scientific work during his lifetime, but he devoted a substantial part of his time here on Earth to imparting that wisdom to the rest of his fellow humans. He understood that without education we are nothing. Without education we would still be foraging for food along with the other species. Without education, almost everyone alive on this planet today would never have been born. And so he devoted his life to education. As I said, I'm a big fan of Carl Sagan.

In this book my intention is to explain how the science of classical mechanics has affected our world in ways that are commonplace and accessible to the average person as opposed to scientists and engineers. As such, it should be considered non-technical in content. Nonetheless, I hope that these two latter groups will find pleasure in my somewhat purposefully simplified exposition of the subject.

Satisfying all of these disparate groups simultaneously is a difficult challenge, and it is at least in part for this reason that I have chosen to restrict my views to classical mechanics. This term is intended to imply that field of mechanics that developed prior to the advent of quantum mechanics, thus encompassing the pervasive field of Newtonian mechanics. Furthermore, I will not delve deeply into the subject of either special or general relativity in this book. Similarly, because it does not fall under the cognomen of classical mechanics, I will eschew the subject of quantum mechanics. These all-important subjects are amply explained in a number of exemplary volumes published in recent times, so much so that I fear my coverage of these developments would fail to measure up. Thus, as I said, I will confine my coverage to the subject of classical mechanics and henceforth in this book when I utilize the term mechanics, it is implied to be synonymous with the term classical mechanics.

The perceptive reader may ask exactly what is meant by the title of this book. This is indeed an excellent question. I have purposefully chosen a duplicitous title, and for good reason. There are in fact two objectives that I have set for myself

herein, and the title of this text bridges both. First, it is my aim to explain in layman's terms how mechanics played a role in the development of so many achievements throughout the history of the universe as we know it. In some cases we do not really know how this happened, but as the reader will soon discover, this will in no way hinder me from conjecture. Second, and perhaps more importantly, it is also my intention to describe the more obvious meaning within the title—how specific developments that involved mechanics actually served to *shape* our modern world. This latter goal is indeed a lofty ambition. With this in mind, I hope that "my take" does not disappoint.

I may be reaching high, but it is my desire that the admittedly unusual perspective contained within this book will somehow accomplish the same thing for mechanics that Dr. Sagan did for Astronomy, Astrophysics, and whatever else he chose to write about—to enlighten not only those familiar with my discipline, but also those who may not be well-versed in the subject and are simply curious to know more about mechanics. If so, then my aim is indeed not too high, but has squarely struck my intended mark. And so, dear reader, I wish you both an enlightening and enjoyable read.

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