PREFACE

Scientific theories do not last forever. Most of them are usually abandoned and replaced by more advanced theories. A few lucky older theories continued to survive for a while, but only as particular cases of more general theories, as was with Newtonian mechanics after Albert Einstein proposed his general theory of relativity. There is, however, one theory, known as the *vortex theory* that stubbornly refused to either go into oblivion or to become a particular case of a more advanced concept. Introduced at the dawn of science almost 2600 years ago, it had passed through several phases of accumulation of its strength.

During the first four phases (see Chapters 1 through 12 of this book), the development of the vortex theory followed the same pattern. Each time, this theory managed to bring attention of a new generation of brilliant scientists, who were enchanted by a deep physical meaning of its basic concept. But, although they employed the latest advances in science, none of them was able to produce a mathematical tool making the vortex theory practically usable. Consequently, the wonderful theory repeatedly faded away and stayed underground waiting for another chance to come back.

The original version of the vortex theory was based on observations of vortices in rivers, tornadoes, and even in a cup of tea. It was proposed by several outstanding Greek philosophers, including Anaxagoras, Empedocles, Leucippus and Democritus; the last is mostly known nowadays for his introduction of the atom. The second coming of the vortex theory took place soon after the Copernican revolution. During that time, among the most ardent supporters of this theory were Johannes Kepler (remember Kepler's three laws!), René Descartes, the inventor of analytical geometry, Christiaan Huygens, the originator of the wave theory of light, and Gottfried Leibniz, the inventor of contemporary calculus.

The vortex theory came to life for the third time during the age of exciting discoveries in electricity and magnetism. It became the subject of serious analytical investigations conducted by several extraordinary scientists, including Hermann Helmholtz, William Thomson (Lord Kelvin), James Maxwell, who unified electricity with magnetism, and J.J. Thomson, the discoverer of the electron. Still, it appeared that all the amazing advances in electromagnetism were not sufficient to make the vortex theory work.

Its fourth return in the 20th century was barely noticeable. In the first half of the century, both the scientists and general public were fascinated by the exciting developments of quantum theory, wave mechanics, and both special and general theories of relativity that became the scientific tools of the upcoming atomic age. The second half of the century was dominated by the standard model, a brainchild of quantum mechanics. Still, even under these unfavorable conditions, several scientists tried to revive the vortex theory. They proposed models of electron based on the concept of vortices in which velocity of light played a crucial role. Further developments were stimulated by exciting observations of vortices formed in outer space and in plasmas, and the discovery of the double-helical DNA. The culminating point of the fourth period was the introduction of a unique twistor theory by the British mathematician Roger Penrose.

By the end of the 20th century, the conditions in physics had suddenly changed. Although the standard model still remained the best tool accurately predicting the results of numerous experiments, its predictions proved to be applicable only to a small fraction of matter contained in the universe. Out of the scope of the model were newly discovered dark matter, dark energy, and black holes that occupy from 95 to 99% of the universe. The lack of knowledge provided a strong impetus for proposing numerous alternative theories, with a famous superstring theory among them. But the advances of the superstring theory were subdued by insurmountable mathematical difficulties mainly caused by a use of a multi-dimensional space.

In 1993 I discovered a unique space-time spiral element, called the *toryx*. The ability of the toryx to be turned inside out made it perfect for modeling polarized prime elements of matter. At about the same time I discovered a close offspring of the toryx called the *helyx* that turned out to be ideal for modeling polarized prime elements of radiation particles. Space-time properties of the toryx and the helyx are governed by eight fundamental equations that can be viewed as their genetic codes. This discovery led me to the development of a new version of the vortex theory called *Three-Dimensional Spiral String Theory* (3D-SST).

Outlined in Chapters 13 through 16, 3D-SST absorbs many valuable aspects of current theories. Among them are the Heisenberg's uncertainty principle, the concept of maximum velocity in the universe, the relativistic character of mass, the concept of quarks, the idea of strong and superstrong (color) forces, the quantum energy states of atomic electrons, etc. At the same time, 3D-SST modifies and further extends these ideas by outlining the process of polarization of Nothingness, the consequent formation of prime elements of the universe, the unified character of subluminal and superluminal velocities, the unity between

negative and positive infinities, the concept of cyclic absorption and release of energy by elementary particles, the relativistic character of electric charge, the unified nature of strong, superstrong, gravitational, and electric forces, and the unified structure of prime elements of the entire universe, including ordinary matter described by the conventional physics and also exotic dark matter and dark energy.

As any new theory, 3D-SST includes several ideas that some scientists may find controversial. To avoid any confusion, the author separated the parts of the theory that are based on prudent conventional assumptions from the parts that required some speculative propositions. Following this approach, Chapter 13 describes a stand-alone space-time model of toryx and helyx. The model is based on several clear non-speculative assumptions, and its equations can readily be verified by using commonly known mathematical methods. Then Chapters 14 and 15 outline some possible applications of the space-time model for defining main properties of prime elements of the universe and their offspring, elementary and composite particles of both visible and dark matter.

Chapter 16 outlines a possible way of unification of strong, superstrong (color), gravitational, and electric forces. Here again the proposed theory is divided in two parts. The first part describes in pure mathematical non-speculative terms the Coulomb forces between thin rings with evenly distributed electric charges. Then the second part utilizes the above mathematical model to explain strong, superstrong (color) and gravitational forces between particles. A completely unexpected outcome of 3D-SST is the proposition of a unified purpose for human race.

Acknowledgements

This book is primarily about the great scientists of all times. Directly or indirectly, they all affected the development of my ideas, and if some of these ideas have any merit, the credit must go to these studious servants of science. I am also grateful to several contemporary scientists for making their valuable and stimulating comments on my novel ideas. Among them are: Professor Carlo Rovelli (Department of Physics and Astronomy of the University of Pittsburgh), Professor Gregory M. Townsend (Department of Physics of the University of Akron), Professor Clifford Taubes (Department of Mathematics, Harvard University), who made encouraging comments on my idea of multiple-level Universe.

Several American physicists made valuable comments on my model simulating strong and electric forces between thin rings with evenly distributed electric charges. Among them are: Professor Rudolph Hwa (Department of Physics, University of Oregon), Dr. Blair M. Smith

(Innovative Nuclear Space Power and Propulsion Institute, University of Florida), Professor Edward F. Redish (Department of Physics, University of Maryland), Professor David F. Measday (Department of Physics and Astronomy, University of British Columbia, Canada), Dr. Eric Carlson (Department of Physics, Wake Forest University), and Professor Warren Siegel (Department of Physics and Astronomy, Stony Brook University).

Thanks to the recommendations made by Dr. Akhlesh Lakhtakia (Department of Engineering and Mechanics, the Pennsylvania State University), I was able to publish the first three papers describing my version of the vortex theory. My latest five papers on this subject were published with the assistance provided by Dr. Harold Fox (Editor of *The Journal of New Energy*), Dr. Cynthia Kolb Whitney (Editor of the Journal *Galilean Electrodynamics*), and Yasuhiko Genku Kimura (Publisher and Editor-in-Chief of *VIA*, *The Journal of Integral Thinking for Visionary Action*). I appreciate very much my valuable discussions with Marvin Solit, Director of Foundations for New Directions, and his ideas about possible space orientations of toryces.

I am especially grateful to Mr. Nobuyuki Kanai from Osaka, Japan who followed my research on spirals for the last several years. He impressed me by his deep knowledge of history of science. After reading the manuscript of this book, he made many valuable suggestions and necessary corrections. He also concluded:

> Dr. Ginzburg has ventured to find the simple principles hiding behind the diversities of macrocosm (the Universe) and microcosm (the world of elementary particles). His idea of combining the two spiral trails, toryx and helyx, into one basic unit has everlastingly fascinated me like a simple but beautiful tapestry. I can feel how deeply he has respect for not only well-known scientists but less-known ones whose studies were no less wonderful than theirs. I firmly believe this book is one of the greatest achievements in all science.

My hope is that this book will help the readers to maintain their enthusiasm about the future of science.

Vladimir B. Ginzburg.