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Dedication

To the children of future generations:

The contingencies on these generations contain the products of our present behaviors, products born of the struggles between the pre-scientific and scientific contingencies that produce our present labors. May we leave a lasting legacy for these generations of children, a legacy worthy of their appreciation. ∞

Acknowledgements

Many people deserve thanks and praise for early on catching many of the sins of omission and commission that crept into my massaging of a wide range of related materials into the manuscript that became this book. While any residual problems are of course my own, I want to express my deepest appreciation to a subset of all those deserving folks. This small group of friends and colleagues went above and beyond the usual levels of reviewer assistance by providing extensive, careful, detailed and exacting corrections and commentary that particularly improved the clarity, readability, and topical coverage of this work. In alphabetical order (and from the USA unless otherwise specified) these people are Karen Clemons, John Ferreira, Lawrence Fraley, Bruce Hamm (from Canada), Philip Johnson, Werner Matthijs (from Belgium), James O’Heare (from Canada), Jón Sigurjónsson (from Iceland), and William Trumble. They each and all have my sincerest thanks (and I hope we are still friends).

Having had the pleasure of editing Lawrence Fraley’s 2008 *General Behaviorology* book for publication, I must admit to a certain awe at the extensive repertoire that Professor Fraley’s contingencies built, and I owe to him (actually, to the published results that those contingencies produced) a substantial debt of intellectual expansion and emotional gratitude. Without accruing those debts, I doubt I could have written half as much, or half as well, in providing this short introduction to behaviorology, from which I hope all humanity may derive benefits. My thanks also go to the State University of New York at Canton (SUNY–Canton) for the adjustment in work assignments, in each of two semesters, that helped me make meaningful progress on the manuscript for this book. *SFL* ☪

Foreword

Change often happens at a rapid and, for some people, uncomfortable pace. People have probably felt this way since the time humans began using tools. Thought leaders in every generation have looked at the “Great Work” of their time, and attempted to understand how and why events manifest themselves in certain ways, usually because this improves their influence over the change occurring about them.

For Dr. Stephen Ledoux and his colleagues, the *Great Work* that they have undertaken is to understand how and why humans (and other animals) behave in preparation and response to given circumstances. Please note that a key word here is “understand.” These scholars have named their discipline Behaviorology since, by design, it does not fall into the area of Psychology, not even as a subset. Behaviorology is a study of behavior, treated as a natural science, something I can appreciate as a biologist. Behaviorology, therefore, requires adherence to natural–science philosophy as well as the application of scientific methods, hypotheses, proofs, repeatability, and convincing demonstrations. This deliberately removes the elements of superstition, spirituality, and mysticism.

One might rightly ask if the elements listed as removed from the study of Behaviorology do not also influence behaviors. The answer is that, of course, they do; they are behaviors. Since a goal of Behaviorology is understanding (and prediction, and so on) however, superstition, spirituality, and mysticism, as concepts of Faith, are incongruous with a demonstrable understanding. By definition this must be so or we would not classify such beliefs as “Faith.”

Behaviorology is also beginning to find a niche in mainstream education, 100 years after its conceptual introduction, with scholars and champions who have benefited from “standing on the shoulders of giants” as Newton remarked. Professor Ledoux’s text on Behaviorology now joins a collection of other books on the subject to suggest and complete a curriculum from undergraduate through graduate studies. This book presents examples and case studies that are illustrative and understandable. However, the integration of Behaviorology into the education curriculum of higher education has not been easy.

At the current time, many aspects of the higher education system at colleges and universities are being tested and may be found lacking and insufficient to the task of teaching a new generation of students in a new learning environment. This environment involves required remedial assistance, “flipped classrooms,” and the emergence of Massive Open Online Courses (MOOCs) to name but a few of the newer components. What many institutions do not do well is to prepare students for jobs that currently do not exist but will in a few years, or to accept curricular changes designed to teach what students need as opposed to what faculty can and want to deliver. The discipline of

Behaviorology, ironically, not only offers new ideas to address behavior, but tools with which to better educate in many areas.

Clearly the *Great Work* of understanding human behavior underlies most of the other *Great Works* of our time. What importance may be placed on our behavior, as a people, as we deal with climate change, the availability of fresh water, appropriate health care, or wars? Behaviorology, as a natural science, offers us hope and new approaches to understand current and historical questions about behavior. Dr. Ledoux's clear prose, illustrative examples, and poignant storytelling make this book's message accessible to many levels of readers as well as useful to those of us seeking new understanding and the opportunity to make a difference.

Perhaps of even greater importance, this book will interest those listening to the natural scientists who recognize that our global problems, and any solutions, clearly involve human behavior. We all need the science that addresses this area. This book introduces that science, Behaviorology, which joins the natural-science team working to solve global problems. This book helps us all—natural scientists, engineers, and concerned citizens—both understand, and better deal with the connections between behavior and timely solutions to our *Great Works* problems.

Read this book with an open mind (which is not an entity inside you, as you will see). You will thus enjoy a journey into a new discipline of cutting edge knowledge about, and with extensive applicability to, some *Great Works* of our time.☺

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Preface

During the last decades of the twentieth century, traditional natural scientists (e.g., physicists, chemists, and biologists) increasingly realized that solutions to the major (and minor) problems around the globe, to which they were turning their attention, needed changes in human behavior to work. Yet most were generally unaware that a natural science of behavior, now called behaviorology, was available to address its part in the solutions. The centenary year of behaviorism—2012—provided an occasion to review this discipline for them, if ever so briefly, in the form of an abridged article, “Behaviorism at 100,” in the first issue (January 2012) of the centenary volume of the journal *American Scientist*; the unabridged, peer-reviewed version appeared in volume 15, number 1, of the journal *Behaviorology Today* two months later. To support the teamwork of all the natural sciences in solving local and global problems, this book elaborates on the content of the unabridged article.

Chapter 1 features an expanded version of that article as an overview of the first hundred years of the natural science of behavior and its emergence as the separate and independent discipline of behaviorology, which is not any kind of psychology. Much science and history happened in this first hundred years, which made Chapter 1 the longest chapter in this book. As a summary it touches briefly on most of the topics in the book thereby showing their interrelations. However, this brevity makes Chapter 1 seem a bit difficult.

Chapter 1 may also seem difficult for two more reasons. It begins the process of countering 50,000 years or more of pre-scientific cultural conditioning about human nature and human behavior. And it also begins some gradual shifts, throughout the book, in grammatical phrase forms and word usages—making more standard some otherwise non-standard forms and usages—toward a more efficient grammar (e.g., occasionally using nouns as adjectives) that better supports scientific realities by containing fewer inherent implications of ghosts (i.e., mystical—as in untestable, unmeasurable—behavior-directing agents) residing inside bodies, a point that also receives more complete treatment in various chapters. In the hope that reader’s rank *science helping to save our planet* as more important than maintaining certain aspects of grammar that have been harming us for millennia by coincidentally supporting superstition, I beg the reader’s indulgence in support of these grammatical shifts.

The chapters, which stress the importance of a naturalistic philosophy of science in this and all natural sciences, divide into two parts. Part I (Chapters 1–12) pursues history, concepts, principles, methods, and practices. Part II (Chapters 13–24) pursues advanced developments and natural-science answers to some of humanity’s long-standing questions.

Many options arose for the title of this book. The title needed to present not only the “running out of time” theme but also the introductory status

of the book, and to what end. The book introduces the natural science of behavior, about which the editor of *American Scientist* said (at the start of that article that became Chapter 1) “Over its second 50 years, the study of behavior evolved to become a discipline, behaviorology, independent of psychology.” This book aims to introduce behaviorology to traditional natural scientists and anyone who works to solve global problems, because the discoveries of this natural science contribute to the success of their team efforts to bring about solutions in a timely manner. I believe that each one would want to know more about behaviorology in the same way that each knows something about all the other natural sciences beyond her or his own specialization.

On that premise this book leaves out discussions of some basic science terms that professional scientists already know but with which students may as yet be unfamiliar. If someone uses this book to introduce the behaviorology discipline to first-year students, then a dictionary would likely be of more than the usual value for these students; of course, they would also have a professor to help them. Note, however, that this is *not* a textbook in or for psychology!

This book describes many of the discoveries and applications of the first 100 years of behaviorological science, particularly regarding *why* human behavior happens. The undercurrent throughout the book concerns the relevance of this natural science not only to helping build a sustainable society but also, in that process, to addressing the wide range of local and global issues confronting humanity, all of which have definitive behavior components the address of which benefits from a comprehensive natural science of behavior. These issues range from backyard burn barrels, through dozens of increasingly complicated and problematic concerns, to overpopulation, which is perhaps humanity’s most fundamental practical problem. No book, including this one, solves such problems by itself, but the more humanity understands about the causes of behavior, which is the topic of this book, the more success humanity will have at solving such problems in the timely manner that prevents us from having to experience the worst effects of these problems.

While this book serves as a first book about behaviorology, some readers may find that this book does not go far enough, for them, into the systematic substance of the behaviorology discipline. To make going farther easier, this book by design introduces the topics that Lawrence E. Fraley’s 1,600–page, three–course textbook, *General Behaviorology—The Natural Science of Human Behavior*, covers in comprehensive detail. Fraley’s book, however, has too much depth and detail to serve easily as a first book on behaviorology. The present book addresses this need. (For the e–book edition, and later printings, some changes or additions improved a handful of paragraphs across the chapters.)✿

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January 2014 ☺

On Typography & Author Contact

This book is set in the Adobe Garamond, Adobe Garamond Expert, and Tekton collections of typefaces. In addition, a valuable basis for the typographic standards of this work deserves acknowledgment. As much as possible, this book follows the practices described in two highly recommended volumes by Ms. Robin Williams (both of which Peachpit Press, in Berkeley, CA, USA, publishes). One is the 1990 edition of *The Mac is Not a Typewriter*. The other is the 1996 edition of *Beyond the Mac is Not a Typewriter*. For example, on page 16 of the 1990 book, Williams specifies practices regarding the placement of punctuation used with quotation marks, an area in which some ambiguity has existed with respect to what is “proper.” Also, since some confusing alternatives remain regarding the use of hyphens and dashes, this book would simply limit hyphens to separating the parts of words that a line end breaks (although words never broke at line ends) while “en dashes” separate the whole words of compound adjectives, and “em dashes” set off multiple-word—a compound adjective with an en dash—phrases or clauses.

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For more information, see the pages of *Behaviorology Today* (ISSN 1536-6669) which is the journal of TIBI (The International Behaviorology Institute). TIBI renamed it *Journal of Behaviorology* (ISSN 2331-0774) in 2013. Also visit www.behaviorology.org which is the TIBI web site. Both the journal and the web site contain additional material and works by this author.

Some related volumes may interest the reader. In addition to the three-course *General Behaviorology* textbook that Fraley authored (2008) and which the *Preface* mentioned, another volume is *Origins and Components of Behaviorology—Second Edition* (2002). Stephen F. Ledoux prepared this book, to which each of the four founders of TIBI contributed papers (and a *Third Edition* of this book, along with an updated book of study questions for it, should be available before 2015). A book of study questions, for *Running Out of Time...*, should also be available before 2015; contact the author for a progress report in late 2014. Books of study questions help interested readers master contents more thoroughly. Lawrence E. Fraley wrote two other volumes that also deserve mention. These are (a) *Dignified Dying—A Behaviorological Thanatology* (2012), and (b) *Behaviorological Rehabilitation and the Criminal Justice System* (2013). ABCs, of Canton NY, USA, is the publisher of all these books except *Running Out of Time...*, which BehaveTech Publishing (of Ottawa, Ontario, CANADA) publishes.

You can order additional copies of *Running Out of Time—Introducing Behaviorology to Help Solve Global Problems* from the distributor, **Direct**

Book Service, Inc., at 800-776-2665. They will likely answer the phone with “Dogwise,” because one of their oldest and most popular specialties involves books about our canine friends; several of these books already specifically apply the laws of behavior that *Running Out of Time...* systematically introduces. ☺

