REVIEW: Douglas A. Vakoch and Matthew F. Dowd, *The Drake Equation: Estimating the Prevalence of Extraterrestrial Life through the Ages*

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REVIEWS

Douglas A. Vakoch and Matthew F. Dowd. Editors. *The Drake Equation: Estimating the Prevalence of Extraterrestrial Life through the Ages*. 319 pp. Cambridge University Press, Cambridge, U.K. 2015.

Andrew I. Oakes*

Fifty-seven years ago an American astronomer sketched out a seven-variable equation for discussion with his like-minded colleagues. Presented to a small ten-person invitational gathering in 1961 at the National Radio Astronomy Observatory in Green Bank, West Virginia, the purpose of the equation was to stimulate debate and to ponder systematically the likelihood of extraterrestrial intelligent life. The meeting's concluding aim was to see if the quantity of in-principle observable, technical civilizations in the cosmos could actually be determined. Frank Drake was the astronomer who penned the equation "as a way to organize thinking and discussion" (p. 183). In time, the original equation became known as the Drake Equation.

With the publication of *The Drake Equation: Estimating the Prevalence of Extraterrestrial Life through the Ages*, co-editors Douglas A. Vakoch and Matthew F. Dowd have assembled a very timely and scholarly effort that brings the now almost three-score years old (and still ongoing) discussion to current times. The book is recognized as the first stand-alone volume on this topic. Professors Vakoch of the SETI Institute and Dowd of the University of Notre Dame Press collaborated in gathering a fourteen-chapter book, which contains a foreword by Frank Drake, an introduction placing the Drake Equation in context by astrobiologist Steven J. Dick, and an afterword by physicist Paul C. W. Davies. In his wrap-up observations, Davies notes that, as of today, the first three terms of the Drake Equation refer to factors "that are now known with reasonable precision [compared to 1961] ... for meaningful statistics to be developed" while the remaining four factors, "the biological ones," have not experienced comparable "progress" and have "not been matched by a similar leap in understanding" (p. 298).

Any university student or historian and philosopher of science will be intrigued by this book, not only by the many millennia-old question of the

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plurality of other worlds and their possible extraterrestrial civilizations, but also by the modern and appropriate science-based approach this discussion has now entered, taking the question from the pre-Drake science-fictional domain to a more robust level of scientific analysis that allows researchers to conduct a serious investigation of this age-old subject. With the high calibre of scientists contributing their analyses to the volume, it is clear that it is no longer perceived as a career-limiting move to pursue such thought-provoking questions.¹ The remarkable progress in astronomy since 1961, especially in astrobiology, has elevated the topic to a serious level of discussion, whereby a firm answer can one day be indeed given—one way or another—after much more work is done on the astronomical, social, and, especially, astrobiological factors.

The multi-chapter text is the last of an eight-volume Cambridge University Press Astrobiology Series. In his foreword, Frank Drake notes that in 1961 “very few people worked on the variables: today the number of workers is not really known but is surely in the many thousands”; and he further adds, “Now it is time to stand back and look at where we are. That is what this book is about” (p. xvii).

We are informed by the co-editors that there are two specific reasons for writing this book. The first is to provide a comprehensive review and analysis of each term of the equation. This is done expertly. The book succeeds admirably in providing a solid “resource for scientists and graduate students actively conducting research in the many disciplines related to astrobiology” (p. xx). The second reason is to place contemporary astrobiological research in its historical context. This is done effectively by featuring two chapters for each term of the seven-termed equation. The first chapter on each term covers the concept under review prior to the 1961 Green Bank conference, while the second companion chapter examines developments post-1961 to the present. The twinned-chapters approach embodies a very creative way to outline the state of affairs then and now. Each chapter, whether it deals with the pre- or post-1961 period, offers comprehensive historical background information and abundant bibliographic references that would be welcomed by any serious scholar. The contributing authors include an array of internationally known expert researchers from the fields of astronomy, anthropology, astrobiology, history and philosophy of science, neuroscience and animal behaviour and intelligence, space science, and SETI (Search for Extraterrestrial Intelligence) research.

The Drake Equation serves more than just the task of updating the Drake

¹ Recall the late Carl Sagan’s science fiction novel of 1985, *Contact*, where astronomer Dr. Ellie Arroway faces professional opposition in seeking extraterrestrial signals from space, and her loss of research funding from the ruling scientific establishment.

Equation itself. The book traces the thinking of many historical individuals from antiquity, through the Scientific Revolution and the Enlightenment, to modern times. The authors incorporate into their analyses well-known personalities who are often mentioned in studies of history, science, and philosophy. As a textbook, *The Drake Equation* appears as an indispensable companion for understanding the scope of astronomy through the ages, and the role of astrophysics and astrobiology in current terrestrial and space-based research in our solar system and deep within our galactic home within our universe. The book is indeed a welcome addition to the Cambridge series and has every potential of becoming a classic with a long life in print.

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