Weaving The Universe

Is Modern Cosmology
Discovered or Invented?

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World Scientific

NEW JERSEY • LONDON • SINGAPORE • BEIJING • SHANGHAI • HONG KONG • TAIPEI • CHENNAI

Published by

World Scientific Publishing Co. Pte. Ltd.

5 Toh Tuck Link, Singapore 596224

USA office: 27 Warren Street, Suite 401-402, Hackensack, NJ 07601

UK office: 57 Shelton Street, Covent Garden, London WC2H 9HE

British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

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ISBN-13 978-981-4313-94-0

ISBN-10 981-4313-94-7

Printed in Singapore.

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PREFACE

The philosopher Descartes famously said “I think, therefore I am.” The modern theoretical physicist might say “I think, and can invent the universe.” That science is more subjective than commonly believed was put forward by the great astronomer Sir Arthur Eddington, who concluded that “the stuff of the world is mind-stuff.” The aim of this book is to take a fresh look at the idea that physics is not so much discovered as invented, or that modern cosmology is studying what might be called the imagined universe.

I absorbed the works of Eddington while doing graduate work in cosmology at Cambridge in the 1970s. His views were controversial in the 1930s, but it seems to me that modern results in quantum theory and relativity have made them more acceptable. During a career spent largely solving problems having to do with the big bang, I have come to see that modern science has less to do with experiments than with the marvelous machinations of the human mind.

The cosmologist with his mathematics is rather like the weaver at his loom. The weaver sets up the basic lines or warp, sorts through bundles of material, and adds this as the weft to produce a garment. The scientist sets up his laws, considers the properties of matter, and if skillful enough puts out a coherent account of the universe. Though

the analogy should not be pushed, both the weaver and the cosmologist are subject to judgment by those who follow fashion. I do not know if my views on the nature of science will fare any better than those of Eddington. In any case, no blame attaches to the colleagues who assisted my thoughts. These include the philosopher John Leslie (who came up with the mind-weaving analogy), the historian Martin Clutton-Brock, the cosmologist Paul Halpern and the physicist Francis Everitt (who also provided hospitality at Gravity Probe B). And of course there are other, more subtle acknowledgements, which follow from the thesis that theoretical physics is akin to other products of the human mind, like classical music, prose and fine art.

This book is directed toward those who think about things. Though it is written from the viewpoint of a professional cosmologist, I hope it will prove enlightening to anybody who takes “time out” to reflect on existence and enjoy the results of our culture, however it is expressed. (As I suggest in the text, the equation of the physicist can be viewed as a kind of miniature work of art, to be noted and admired before moving on.) Each person has an individual kind of mind syntax, which allows them to appreciate the achievements of other people in a unique way. Art, music and literature have generic forms of syntax, so they are appreciated and understood by large numbers of people. I am suggesting that science is comparable. Einstein’s field equations of general relativity are just as rewarding to the physicist as the performance of a Tchaikovsky ballet is to the person who likes dance. In this book, I hope to broaden appreciation of something we all share, namely the power of the human mind.

Paul S. Wesson

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