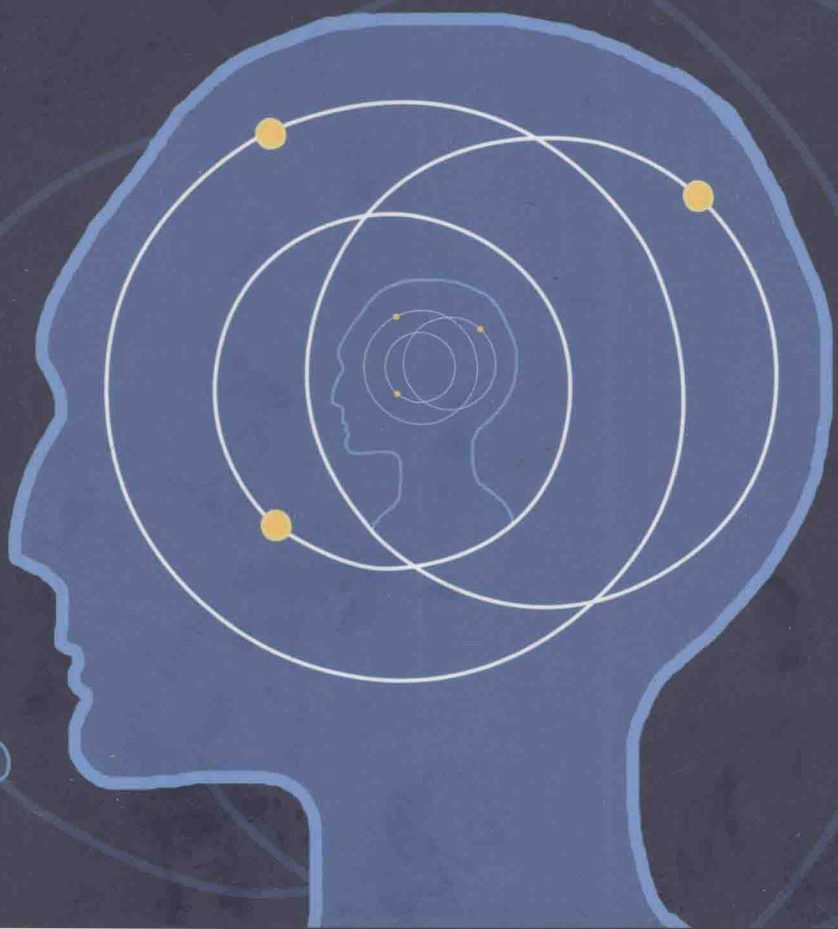


LEON N COOPER

SCIENCE AND HUMAN EXPERIENCE

Values, Culture, and the Mind



SCIENCE AND HUMAN EXPERIENCE VALUES, CULTURE, AND THE MIND



Leon N Cooper



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SCIENCE AND HUMAN EXPERIENCE



Does science have limits? Where does order come from?
Can we understand consciousness?

Written by Nobel Laureate Leon N Cooper, this book places pressing scientific questions in the broader context of how they relate to human experience.

Widely considered to be a highly original thinker, Cooper has written and given talks on a large variety of subjects, ranging from the relationship between art and science, possible limits of science, to the relevance of the Turing test. These essays and talks have been brought together for the first time in this fascinating book, giving readers an opportunity to experience Cooper's unique perspective on a range of subjects.

Tackling a diverse spectrum of topics, from the conflict of faith and science to whether understanding neural networks could lead to machines that think like humans, this book will captivate anyone interested in the interaction of science with society.



Leon N Cooper is the Thomas J. Watson Senior Professor of Science at Brown University and Director of the Institute for Brain and Neural Systems. He has received numerous awards and prizes for his scientific achievements, most notably the 1972 Nobel Prize in Physics (with J. Bardeen and J. R. Schrieffer) for his studies on the theory of superconductivity.



Rembrandt Harmenszoon van Rijn, *Doctor Faustus* (1652).

“This is a fascinating melange of essays on topics ranging from the question of fraud in science to Euclidean geometry and the ‘neural-network’ approach to brain research. Cooper’s characteristic combination of lucidity and common sense had me nodding in enthusiastic agreement on just about every page.”

Anthony Leggett
Nobel Laureate

“From black body radiation to brain circuitry; from Copenhagen to consciousness – this well-curated set of essays crackles with bracing insights about science, and about the world that science strives to fathom. An almost hushed voice (often with a slightly jocular tinge), marshaling volumes of data into an abruptly well-ordered, breathtakingly lucid condensate: that’s Leon Cooper in a nutshell.”

Richard Granger
Dartmouth College

“As a scientist and a humanist, Cooper is well-versed in philosophy, literature, art, and the practicalities of making science serve humanity, as opposed to being in thrall to special interests. His intellectual open-mindedness and compelling prose style make *Science and Human Experience* a thought-provoking pleasure to read.”

Peter Byrne

Author of *The Many Worlds of Hugh Everett III: Multiple Universes, Mutual Assured Destruction, and the Meltdown of a Nuclear Family*

To

Michael, Liam, Nico and Manisha
May your world be a happy place

PREFACE



The essays in this collection are taken from articles and lectures that I have written or delivered over many years – some of which I hadn't looked at in quite a while. Putting them together I am struck by the recurrence of certain themes. This shouldn't be surprising since I have been thinking about these subjects for a long time. They occur in somewhat different contexts and reflect the evolution of my thoughts on the relation of science to other human activities.

Since some of the articles were written years ago, I have occasionally included footnotes to update matters where the situation has dramatically changed; but otherwise I have pretty much left things the way they were because that was the way I thought about them at the time.

What is more problematic is that in the originals there are paragraphs and even sections that are repeated from one article to the next. As with itinerant actors and musicians over the centuries, each performance is pieced together from those that have come before – self-plagiarism. But each is presented in a new package and sometimes the package is as interesting as the content.

So I've deleted extended repetitions; also in some of the essays I have excised sections that, in my opinion, don't contribute to the main line of thought and, sometimes, are discussed in other essays.

However, in some cases a few paragraphs are so integral to the argument that I have decided to leave them even though they do repeat what was said before. I imagine that many readers will pick

among the essays so that it seems reasonable to include some repetitions to make each complete by itself. For those intrepid few who begin with the first and read through to the last, I can only express my apologies and counsel a willingness to skip the paragraph or two that they have read before.

What we have here, therefore, is a collection of my thoughts as they were and as they have evolved over many years. I've tried to put them into a sequence that makes some sense but, inevitably, one does jump from one topic to another. I hope that these essays illuminate some of my thinking on a variety of subjects concerning the meaning of science and its relation to other human endeavors.

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PART ONE

Science and Society

