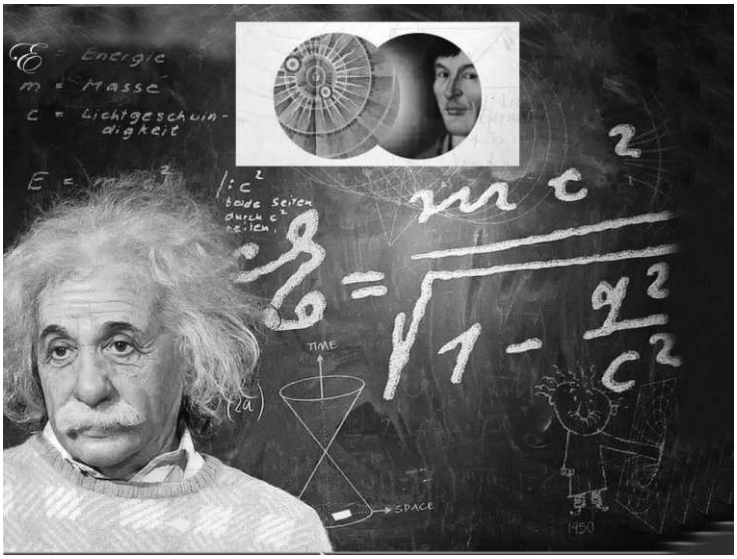
From COPERNICUS To EINSTEIN



By

Hans Reichenbach

ILLUSTRATED &

PUBLISHED BY

E-KİTAP PROJESİ & CHEAPEST BOOKS

www.cheapestboooks.com

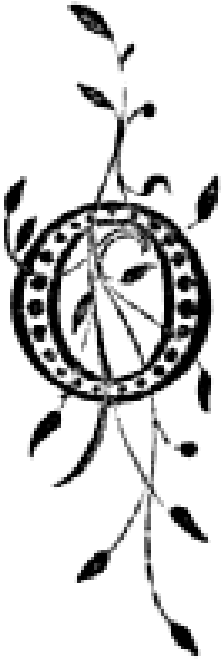
Copyright, 2015 by e-Kitap Projesi

Istanbul

ISBN:

978-625-6004-57-3

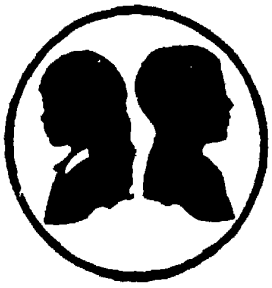
Copyright© *Printing and publication rights belong to the author's & Publisher's own restriction, using and working. According to the law of intellectual and artistic works, without permission in part or in whole not re-produced or re-published. Welding can be done by showing short excerpts..*



From Copernicus To Einstein

BY HANS REICHENBACH

Translated by Ralph B. Winn



NEW YORK
PHILOSOPHICAL LIBRARY, INC.
MCMXLII

CONTENTS

CHAPTER

1. The Copernican View of the World 11
2. Ether 29
3. The Special Theory of Relativity 49
4. The Relativity of Motion 73
5. General Theory of Relativity 85
6. Space and Time 107

ILLUSTRATIONS

FIGURE

1. A Tycho Brahe's Sextant 20
2. Roemer's Observation of Jupiter's Moon 32
3. The Phenomenon of Interference 38
4. The Total Spectrum 46
5. The Diagram of Michelson's Experiment 54
6. A Diagram of the Measurement of the Speed of Light 59
7. A Diagram of the Course of a Light-Signal 63
8. Einstein's "Box Experiment" 86
9. The Curvature of Light-Rays in Einstein's Box 95
10. The Einstein Tower in Potsdam 100
11. Major Segrave's 1,000 Horsepower Auto at Full Speed 110

FROM COPERNICUS TO EINSTEIN

Chapter 1 : THE COPERNICAN VIEW OF THE WORLD

THIS little book purports to serve as an introduction to the great problems of space, time and motion. The inquiries it is concerned with are very old. Men have been forming ideas concerning space and time since times immemorial, and curiously enough, have been writing and fighting about these things with the greatest interest, even fanaticism. This has been a strange strife, indeed, having little to do with economic necessities; it has always dealt with abstract things, far removed from our daily life and with no direct influence upon our daily activities. Why do we need to know whether the sun revolves around the earth or vice versa? What business of ours is it, anyway? Can this knowledge be of any use to us?

No sooner have we uttered these questions than we become aware of their foolishness. It may not be of any use to us, but we want to know something about these problems. We do not want to go blindly through the world. We desire more than a mere existence. We need these cosmic perspectives in order to be able to experience a feeling for our place in the world. The ultimate questions as to the meaning of our actions and as to the meaning of life in general always tend to involve astronomical problems. Here lies the mystery surrounding

astronomy, here lies the wonder we experience at the sight of the starry sky, the wonder growing in proportion to our understanding of immense distances of space and of the stars' inner nature. Here is the source of scientific as well as popular astronomy.

These two branches have diverged in the course of their development. Astronomy, as a science, has come to forget its primitive wonder: instead, it approaches the realm of stars with sober research and calculation. This disenchantment with its subject-matter, which scientific study invariably entails, has permeated astronomy to a greater degree than the layman realizes. In observing the astronomers of today, how they measure, take notes, calculate, how little attention they pay to mysterious speculations, one may be surprised to find the wonderful structure of learning so cut and dry at a close range. Yet nothing is more wrong and more objectionable than the feeling of a heartbreaking loss, with which some people regard the vanishing mysticism of the skies. Although science may have destroyed a few naive fantasies, what she has put in their place is so immensely greater that we can well bear the loss.

It takes perseverance and energy, of course, to comprehend the discoveries of science; but whoever undertakes the study is bound to learn many more surprising things from it than a naive study of nature can disclose. Scientific astronomy has always exercised, in fact, a great influence upon everyday thinking and upon the popular conception of the universe. If it is difficult today to pro-

nounce the name of Copernicus without thinking of a turning point of history, it is not only because the name is connected with a profound transformation in the science, but also because all our knowledge and thinking have been deeply affected by his discovery. The statement that the earth does not occupy the center of the world means more than an astronomical fact; we interpret it as asserting that man is not the center of the world, that everything which appears large and mighty to us is in reality of the smallest significance, when measured by cosmic standards. The statement has been made possible as a result of scientific development in the course of thousands of years, yet it definitely contradicts our immediate experience. It takes a great deal of training in thinking to believe in it at all. Nowadays we are no longer conscious of these things, because we have been brought up since childhood in the Copernican view of the world. However, it cannot be denied that the view belies the testimony of our senses, that every immediate evidence shows the earth as standing still while the heavens are moving. And who among us can declare in all seriousness that he is able to imagine the tremendous size of the sun or to comprehend the cosmic distances defying all earthly ways of measurement? The significance of Copernicus lies precisely in the fact that he broke with an old belief apparently supported by all immediate sensory experiences. He could do it only because he had at his disposal a considerable amount of accumulated scientific thought and scientific data, only