

<<自然与希腊>>

图书基本信息

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内容概要

诺贝尔桂冠物学家薛定谔是20世纪最著名的科学家之一，他关于科学史和科学哲学的演讲久负盛名。

本书是多年来第一次呈现薛定谔的两个最有名的系列演讲文本。

《自然与希腊》从现代科学追溯到古老的西方哲学思想，为20世纪科学图景打开了历史的画卷。

《科学与人文》提出了20世纪的若干最基本问题：科学研究的价值何在？

现代科学成就如何影响物质与精神的关系？彭罗斯的前言将薛定谔的演讲置于当代科学的背景下，证明它们在今天和在第一次出版时有着同样的意义。

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作者简介

薛定谔 (Erwin Schrodinger, 1887-1961) 因为发现量子力学的波动理论获1933年诺贝尔物理学奖, 是20世纪最伟大的科学家之一, 他的影响远远超出了物理学。

他的《生命是什么》是现代分子生物学的先声。

他的系列科学史和科学哲学演讲《自然与希腊》和《科学与人文》以科学家的独特眼光立足现代科学, 追溯古代西方哲学思想, 几十年来散发着长久的智慧芬芳。

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书籍目录

Foreword by Roger Penrose 引言 NATURE AND THE GREEKS 自然与希腊 The motives for returning to ancient thought The competition, reason v. senses The Pythagoreans The Ionian Enlightenment The religion of Xenophanes. Heraclitus of Ephesus The Atomists What are the special features? Bibliography SCIENCE AND HUMANISM 科学与人文 Preface The spiritual bearing of science on life on life The practical achievements of science tending to obliterate its true import true import A radical change in our ideas of matter Form, not substance, the fundamental concept The nature of our 'models' Continuous description and causality The intricacy of the continuum The makeshift of wave mechanics The alleged break-down of the barrier between subject and object Atoms or quanta-the counter-spell of old standing, to escape the intricacy of the continuum Would physical indeterminacy give free will a chance? The bar to prediction, according to Niels Bohr Literature 后记：哲学是科学的后花园

章节摘录

A RADICAL CHANGE IN OUR IDEAS OF MATTER shall now, at last, come down to some special topics. What I have said hitherto may seem pretty long, if you consider it a mere introduction. But I hope it is of some interest in itself - and I could not avoid it. I had to make clear the situation. None of the new discoveries about which I may tell you is frightfully exciting in itself. What is exciting, novel, revolutionary, is the general attitude we are compelled to adopt on any attempt to synthesize them all. Let us go in medias res. There is the problem of matter. What is matter?

How are we to picture matter in our mind?

The first form of the question is ludicrous. (How should we say what matter is - or, if it comes to that, what electricity is - both being phenomena given to us once only?

) The second form already betrays the whole change of attitude: matter is an image in our mind - mind is thus prior to matter (notwithstanding the strange empirical dependence of my mental processes on the physical data of a certain portion of matter, viz. my brain). During the second half of the nineteenth century matter seemed to be the permanent thing to which we could cling. There was a piece of matter that had never been created (as far as the physicist knew) and could never be destroyed!

You could hold on to it and feel that it would not dwindle away under your fingers. Moreover this matter, the physicist asserted, was with regard to its demeanour, its motion, subject to rigid laws - every bit of it was. It moved according to the forces which neighbouring parts of matter, according to their relative situations, exerted on it. You could foretell, the behaviour, it was rigidly determined in all the future by the initial conditions. This was all quite pleasing, anyhow in physical science, in so far as external inanimate matter comes into play. When applied to the matter that constitutes our own body or the bodies of our friends, or even that of our cat or our dog, a well-known difficulty arises with regard to the apparent freedom of living beings to move their limbs at their own will. We shall enter on this question later (see p. 58 ff.) At the moment I wish to try and explain the radical change in our ideas about matter that has taken place in the course of the last half-century. It came about gradually, inadvertently, without anybody aiming at such a change. We believed we moved still within the old 'materialistic' frame of ideas, when it turned out that we had left it. Our conceptions of matter have turned out to be 'much less materialistic' than they were in the second half of the nineteenth century. They are still very imperfect, very hazy, they lack clearness in various respects, but this can be said, that matter has ceased to be the simple palpable coarse thing in space that you can follow as it moves along, every bit of it, and ascertain the precise laws governing its motion. Matter is constituted of particles, separated by comparatively large distances; it is embedded in empty space. This notion goes back to Leucippus and Democritus, who lived in Abdera in the fifth century B.C. This conception of particles and empty space is retained today (with a modification that is just the thing I wish to explain now) and not only that, there is complete historical continuity; that is to say, whenever the idea was taken up again it was in full awareness of the fact that one was taking up the concepts of the ancient philosophers. Moreover it experienced the greatest thinkable triumphs in actual experiment, such as the ancient philosophers would hardly have hoped for in their boldest dreams. For instance, Stern succeeded in determining the distribution of velocities among the atoms in a jet of silver vapour by the simplest and most natural means, of which figure 1 gives a rough schematical sketch. The outer circle (carrying the letters A, B, C) represents the cross-section of a closed cylindrical box, exhausted to perfect vacuum. The point S marks the cross-section of an incandescent silver wire, which extends along the axis of the cylinder and continually evaporates silver atoms, that fly along straight lines, roughly speaking, in radial directions. However, the cylindrical shield Sh (smaller circle) , disposed concentrically around S, lets them pass only at the opening O, which represents a narrow slit parallel to the wire S. Without anything more, they pass on straight to A, where they are caught and, after a time, form a precipitate in the form of a narrow black line (parallel to the wire S and the slit O). But in Stern's experiment the whole apparatus is rotated, as on a potter's wheel, with high speed around the axis S (the sense of the rotation shown by the arrow).

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