1958

XX. Meaning in the Physical Sciences

Robert L. Bloom
Gettysburg College

Basil L. Crapster
Gettysburg College

Harold L. Dunkelberger
Gettysburg College

See next page for additional authors

Bloom, Robert L. et al. "Pt. XX: Meaning in the Physical Sciences." Ideas and Institutions of Western Man (Gettysburg College, 1958), 1-2.

XX. Meaning in the Physical Sciences

Abstract

The twentieth century has seen two major revolutions in our theories of physics concerning nature, and these have made us change many of our concepts about the terms in which nature can be described. The new theories born in these revolutions are the theory of relativity and of quantum mechanics. The biological sciences had their revolutions in the nineteenth century, and while remarkable progress has been made since, nothing comparable to that upheaval has occurred in this century. Of the two massive changes in the concepts of the physical sciences, we can discuss but one here. [*excerpt*]

Keywords

Contemporary Civilization, Nature, Relativity, Quantum Mechanics, Einstein

Disciplines

History of Science, Technology, and Medicine | Physics | Quantum Physics

Authors

Robert L. Bloom, Basil L. Crapster, Harold L. Dunkelberger, Charles H. Glatfelter, Richard T. Mara, Norman E. Richardson, and W. Richard Schubart

XX. MEANING IN THE PHYSICAL SCIENCES

The twentieth century has seen two major revolutions in our theories of physics concerning nature, and these have made us change many of our concepts about the terms in which nature can be described. The new theories born in these revolutions are the theory of relativity and of quantum mechanics. The biological sciences had their revolution in the nineteenth century, and while remarkable progress has been made since, nothing comparable to that upheaval has occurred in this century. Of the two massive changes in the concepts of the physical sciences, we can duscuss but one here.

This chapter will be concerned mostly with the theory of relativity. Before we review the development of the theories of physics that led to Einstein's formulation of the theory of relativity, we would do well to dispel some myths commonly associated with it. Possibly more nonsense has been written about relativity than about any other idea born in this century.

First, it should be noted that the theory of relativity was never the private province of a very few initiates. From the moment Einstein published his work in 1905, a large majority of practicing physicists grasped the ideas, being already familiar with most of the mathematical techniques employed. Little serious objection arose as a result of the theory's being too esoteric for the physicists of the day.

Second, the theory does not say that everything is relative, even in the physical world. The theory was designed to make the basic ideas of physics universal rather than relative. Also, we do well to recall that Einstein constructed the theory to solve a physical puzzle. Most extensions of the theory into nonphysical realms have been made by nonphysicists. While Einstein's work can surely give us valuable hints about questions arising outside physics, we should be mindful of the origin of the theory.

Third, the theory of relativity is not conjecture. The predictions made with the theory have stood every experimental test that has been devised. No physicist today denies its basic authenticity. Further, nearly every practicing physicist needs to understand the theory to do his work.

While it is true that only those who have mastered certain fairly sophisticated mathematical methods can hope to understand all the details and subtleties of the theory, others can grasp many of the ideas and results if they are willing to make a serious effort.