

Preface

A number of years ago, I recognized that the mathematical formalism of modern physics, well developed for describing the inanimate world, cannot be so efficient when the human mind, in particular, mental phenomena, is under consideration. Indeed, this formalism does not take into account such basic human factors as memory, willingness, prediction of future, emotions, moral norms, etc.; there are merely no notions in it that could be used to cope with such human features. Among my colleagues—physicists—I met different opinions on the applicability of physics to describing mental phenomena and human behavior distributed between the antagonistic views. One of them is that physics as a fundamental science just has nothing to do with human behavior. The other considers social and mental phenomena merely subjects of a particular branch of physics. Nowadays existing disciplines such as econophysics and sociophysics are strong arguments for the latter point of view; however, the counterarguments of its opponents seem to be also convincing.

The point of view I defend in this book may be regarded as a certain compromise between them. Namely, it is based on the following three propositions:

- There is a wide variety of phenomena related directly to human behavior and mental processes that admit efficient mathematical description. Moreover, it is possible to find some common principles for modeling properties of natural and social objects including human individuals.
- There are basic notions and sophisticated methods already existing in physics during the last three centuries that can be employed for describing mental phenomena and the behavior of social systems. However, in order to specify them, as well as to find out their plausible generalization, a sophisticated analysis of the main premises accepted in physics is required.
- Novel notions and mathematical formalism, *in addition* to those already existing in physics, should be elaborated for modeling the behavior of individuals and social systems.

Actually these three issues form the reason for the chosen title of this book “Physics of the Human Mind.”

Initially I planned to confine my consideration to these propositions in the given form; however, each time as one of them was studied, I recognized and faced new problems. Some of the newly met problems were analyzed, while the others were only noted; otherwise, it would lead me too far from the proposed goals.

Unexpectedly, to find plausible solutions to some problems, I had to immerse myself into the philosophy of the human mind. After that, it became clear for me that for the mathematical description of mental phenomena to become efficient and successful, it has to be developed as an interdisciplinary branch of science. This branch of science should combine not only physics with its experience in creating models gained during the last 300 years and physiology and psychology with their knowledge accumulated in the last century but also philosophy with its traditions in contemplating general problems since the time of ancient Greece. This combination is reflected in the book contents. Therefore, I hope that this book can be interesting for physicists dealing with systems involving active human actions, as well as for philosophers, because the book employs philosophical background for developing novel formalism and models for solving problems explicitly related to the human mind.

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