

P. A. Zhilin — searching for Truth

*“There is no action without reason in nature;
comprehend the reason and you won’t need the experience.”*

Leonardo da Vinci

The most significant features of scientific society in the end of XX — beginning of XXI century are pragmatism and particular specialization. To the least degree this can be applied to Pavel Andreevich Zhilin. Sincere interest, willing to perceive the Truth and to bring his knowledge to people were the solely motives for his work. Breadth of scientific interests of P.A. Zhilin is impressing — having fundamental character, his works cover practically all areas of mechanics and are extended to electrodynamics and quantum physics. Hardly anyone can express the views of P.A. Zhilin on science better than himself:

“Aim of each science is in perception of the Reality. At the same time the science investigates not the Reality itself, but the simplified models of the Reality. Approaching to the true Reality can be achieved by broadening the model. But to construct a model we need to know at least, what exactly we are going to model. In other words we have to have an a priori idea of the Reality. So we have a vicious circle — to perceive the Reality we need a science, and to construct a science we need to know the Reality. Fortunately the solution of this one would think unsolvable problem is integrated in the human mind, which has two qualitatively different categories: a) intuition and b) intellect.

Intuition is the ability of a human being to sense the world around us directly, which can not be reduced to the five basic senses. This is what poets, musicians, painters and other artists are conscious of. Intuition may be trained as well as every other ability of human being, but it requires permanent and purposeful efforts.

Intellect is an ability of human being to think logically, basing on an a priori knowledge, “built in” the intellect “memory”. A powerful modern computer is a practically perfect analogue of intellect.”

From the paper “Reality and Mechanics”

Doctor of Science, professor, author of more than 200 scientific papers, many of which were published in the key scientific journals, a Teacher who educated more than one generation of disciples — both PhD and Dr. Sci, P.A. Zhilin was a mind of a wide scope and of great erudition.

Being by his position an adherent of the rigorous Science, he was also deeply interested in Eastern philosophies. Fundamental scientific ideas of Pavel Andreevich, concerning the importance of spinor motions when describing events at the micro-level and modelling the electromagnetic field, are in correspondence with different metaphysical concepts of the origin of the World. These ideas in various forms were proposed by the great classics of science, whose works Pavel Andreevich studied in a deep and detailed way. The achievement of Pavel Andreevich is the translation of these ideas from a vague general form of words and intuitive assumptions into a rigorous form of mathematical models. The things he writes on intuitive perception of the world around us is based not only on books, but on his own experience of direct perception of scientific knowledge:

“It is principally possible to use intuitive and intellectual methods of perception independently one of another. Intuitive perception has an imperfection of being impossible to teach it. However namely the intuitive method underlies the creation of scientific models. Pure intellectual approach can make semblance of scientific discoveries, but in fact it’s fruitless. In the last decades special popularity was gained by the so called “black box” philosophy, which refers to the intellectual method achievement. It seemed that this way could bring us to success. But in actual fact it turned out that the black box is worth only when it is transparent, that is when we know its inside beforehand. The merit of the intellectual method is that it can be taught easily.

Let us characterize the intellectual method with the words of Einstein: “Science is a creation of human mind with its freely invented ideas and notions”.

Intuitive method of cognition is best defined by the words of Socrates: By intuitive perception “soul is climbing up the highest observation tower of Being”.

The main thesis of this work is that no real development of science is possible without immediate participation of intuition and there are neither freely invented ideas nor notions existing in nature..”

From the paper “Reality and Mechanics”

Having administrative positions of the head of the Chair of Theoretical Mechanics at the Saint Petersburg Polytechnical University, head of laboratory “Mechanical systems dynamics” at the Institute for Problems in Mechanical Engineering Russian Academy of Sciences, taking active part in the life of society — being member of the Russian National Committee for Theoretical and Applied Mechanics, member of International Society of Applied Mathematics and Mechanics (GAMM), member of Guidance Board Presidium for Applied Mechanics Ministry of Higher Education RF, full member of Russian Academy of Sciences for durability problems, member of three Dissertation Councils, first of all P.A. Zhilin was a Scientist, for whom the science has become the sense of life and the cause of life. He was a Teacher who influenced not only his immediate disciples — PhD students and persons working for doctor’s degree, but also many people considering themselves his disciples to a greater or lesser extent.

P.A. Zhilin considered one of his main tasks broadening the range of application for

mechanics and describing phenomena, being studied in the different fields of natural science from common rational positions, peculiar to mechanics. The following quotation expresses the views of P.A. Zhilin on mechanics as a method of studying nature and on the role mechanics should play in the science of XXI century:

“Mechanics is not a theory of whatever Phenomenon, but a method of investigation of nature. There is no law in the foundations of mechanics, which could be disproved experimentally, not even in principle. In the foundation of mechanics there are logical statements which express balance conditions for certain quantities, and per se they are insufficient for the construction of any closed theory. One has to attract supplementary laws, like the law of gravity, regarded as facts experimentally determined. These supplementary laws may come out to be insufficient or even erroneous, but rejecting them does not influence methods of mechanics. The mentioned nonclosure of mechanics may be considered as its loss by people who think that the humanity is close to the final understanding of the universe. But those who are able to see the Reality, understand how infinitely far people are from ability to describe even relatively simple phenomena of the Reality. That is why the correct method of studying nature is to include a priori indefinite elements, manipulating by which one could improve these or those theories of phenomena of various nature and in that way broaden our idea of Reality. Mechanics sets certain limits for the acceptable structure of these indefinite elements, but preserves a wide enough freedom for them.”

From the paper “Reality and Mechanics”

One of the most important results of the scientific and educational work of P.A. Zhilin is his book of about 1000 pages, which was published only partly during his life. The book represents a course of the Eulerian mechanics, which takes into account on equal terms both translational and rotational degrees of freedom. In this book P.A. Zhilin shares with the reader his ideas related to the taking into consideration spinor motions on the micro-level, application of open bodies models, and introduction of the characteristics of physical state (temperature, entropy, chemical potential) by methods of rational mechanics.

P.A. Zhilin dreamed to open a way to the microworld for the rational mechanics, and to include there the electrodynamics. Many people dream and many people issue big challenges for themselves, but only few of them succeed. P.A. Zhilin knew to make his dreams a reality. Within the limits of classical mechanics he offered continuum models, whose mathematical description is coming to electrodynamics and quantum mechanics equations. Views of P.A. Zhilin often disagree with the common point of view, his ideas are raising debates, but

“Who argues, appealing to an authority, uses not his brain, but rather his memory.”

Leonardo da Vinci

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