ON THE EVOLUTION OF THE SCIENTIFIC INFORMATION ENVIRONMENT*

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Problems arising in the development of the scientific information environment are considered. Emphasis is on the building of international databases for periodical publications and monographs, evaluation of publications and journals, and objective citation. The activity of the S. P. Timoshenko Institute of Mechanics and the journal Prikladnaya Mekhanika (International Applied Mechanics) in this field is exemplified. Suggestions on how to ensure objective citation in articles are discussed.

Keywords: scientific information environment, publications databases, evaluation of articles and journals, objective citation, mechanics examples

1. Introduction. Humanity met the Third Millennium with a qualitatively new phenomenon in the advancement of science—the world’s scientific community, which developed owing to the revolutionary achievements in information technologies and favorable political changes. Science has always developed as a worldwide phenomenon and common value of humanity, successfully transcending national boundaries. However, it was as recent as the late 20th century that the world’s scientific community came into being as a single organism governed, practically in real time, by achievements in information technologies. Research studies conducted at numerous centers of science worldwide can apparently be thought of as occurring within the global scientific community. This is because of two aspects. One aspect is that research studies are conducted by international research teams and in various research areas and that researchers share scientific information at numerous international science-and-technology conferences. The other aspect is the existence of the global scientific information environment within which scientific information can be exchanged in almost real time. Note that the latter aspect is mainly dependent on the successful development of information technologies. Obviously, the world’s scientific community owes its existence and development to the two aspects in aggregate rather than individually. However, the author believes that of the two aspects the latter is relatively new and is a leader in a sense.

The evolution of the global scientific information environment involves numerous problems, trends, and aspects, which it is apparently impossible even to list, let alone discuss, in one paper. There is a condition, obviously indispensable one, that must be met, though to a different extent, throughout all stages of the evolution of the scientific information environment. This condition is general availability, which certainly must be supported by appropriate technologies and, at some stages of development, by adequate financing. We could continue to discuss general issues related to the evolution of the scientific information environment, but the present paper is aimed at issues that are more specific.

In the author’s opinion, of the great many aspects in the evolution of the scientific information environment, the following three may be thought of as independent and specific: (i) creation of various general databases that would represent...
numerous research areas and include data obtained by all major research teams; (ii) creation of a system for the evaluation of scientific publications with participation of independent research divisions; and (iii) assurance of objective citation to scientific publications.

The present paper is intended to discuss these three aspects with reference to the S. P. Timoshenko Institute of Mechanics (the oldest institute of the National Academy of Sciences of Ukraine, established by Prof. S. P. Timoshenko, a world-famous scientist, in 1918) and the journal *Prikladnaya Mekhanika* (published since 1955 and translated into English since 1966; currently the English-language version of the journal is titled *International Applied Mechanics* and published by Springer).

Publishing the present paper in *Prikladnaya Mekhanika* (*International Applied Mechanics*) is justified by the fact that since 2000, the journal has been featuring review papers devoted to the beginning of the Third Millennium. These reviews are concerned with various divisions of mechanics and are written by leading scientists, who contributed to the development of these divisions, from 25 countries (Austria, Azerbaijan, England, Armenia, Bulgaria, Hungary, Germany, Spain, Italy, Kazakhstan, Canada, China, Colombia, Latvia, Mexico, Poland, Russia, Slovakia, the USA, Turkey, Uzbekistan, Ukraine, France, Czechia, and Scotland). In 2000 through 2004, two review papers were published in each issue, i.e., 120 papers total (see [7] for the full list of reviews). Now the journal continues to feature review papers, not regularly as in 2000–2004, but as they are submitted by authors. For example, six review papers were published in 2005 and eight reviews in 2006. Thus, over seven years (2000–2006), the journal has published more than 130 review papers on various problems of mechanics devoted to the beginning of the Third Millennium. These papers were translated into English and published in *International Applied Mechanics* by Springer. This feature of the journal obviously contributes somewhat to the development of the scientific information environment; therefore, the present paper is quite appropriate here. The published review papers would be of value for wide circles of mechanicians, the engineering community, and, certainly, teachers and post/under-graduate students with relevant majors. In this connection, the Institute of Mechanics has been planning to collect all the review papers in a six-volume edition of *Uspekhi Mekhaniki* (*Advances in Mechanics*), the first volume [3] having already been published.

In what follows, we will briefly discuss, considering the introductory remarks, the three aspects in the evolution of the scientific information environment, taking into account the relevant experience gained by the Institute of Mechanics and the journal *Prikladnaya Mekhanika* (*International Applied Mechanics*).

2. On Databases. At present, databases on various research areas have been and continue to be created at various journals, publishing houses, institutes, universities, international funds, etc. When provided with appropriate information technologies and systems, these databases become accessible to the world’s scientific community. It appears that the variety of databases combined with appropriate information systems and connected to the Internet is at the heart of the scientific information environment. Let us now briefly discuss databases separately for periodicals (scientific and research-and-technology journals) and major libraries, because they are in some cases different.

2.1. On Databases for Periodicals. It should first be pointed out that widely known and actively used databases carry information on periodical publications, monographs, collections of research works, and conference proceedings. In this connection, we will only address databases containing information on periodical publications (and some other information in some cases).

In the past, researchers spent months doing library search and microfilming publications. This kind of work took a good deal of scientists’ time, yet did not always guarantee finding of exhaustive information on the world’s scientific achievements. Recently, the capabilities for analysis of the state of the art in specific research areas (analysis of published scientific results) have improved significantly—necessary databases can be accessed on-line through the Internet, scientific journals considering it expedient and necessary to indicate specific databases of their publications.

For example, the inside front cover of *Prikladnaya Mekhanika* tells us that information on publications in *International Applied Mechanics* (translation of *Prikladnaya Mekhanika*) can be retrieved from the following databases:

Cambridge Scientific Abstracts; Chemical Abstracts;
Current Contents/Engineering, Computing and Technology;
The ISI Alerting Services; Materials Science Citation Index;
Mathematical Reviews Database; Science Citation Index;
Science Citation Index Expanded; Zentralblatt MATH; SCOPUS. (1)