

## [US] Erwin Marquit

### Contact Information

Address: Marxist Educational Press  
University of Minnesota  
116 Church Street SE  
Minneapolis MN 55455, USA  
Telephone: 1-612-922-7993 (office)  
Fax:  
Mobile: 1-612-867-3529  
Email Address: [marqu002@umn.edu](mailto:marqu002@umn.edu)  
Homepage:

Erwin Marquit, professor emeritus of physics, University of Minnesota, born in New York in 1926, Doctor of Mathematical and Physical Sciences (University of Warsaw [Poland] 1963), editor of the Marxist studies journal *Nature, Society, and Thought*, associate editor of the Marxist Educational Press, member of the Economic Commission and International Department of the Communist Party USA, contributing editor of the journal *Political Affairs*. His research specialization is dialectical and historical materialism, problems of socialism, and philosophy of physics.

In addition to the United States, he has lived, studied, and worked fifteen years in the Peoples Republic of Poland and the German Democratic Republic. His papers have been published in physics, natural science, and philosophy, and interdisciplinary Marxist publications in Bulgaria, Czechoslovakia, China, Cuba, France, Germany, Great Britain, Italy, and the USSR.

## **Relevance of Philosophy of the Natural Sciences to Scientific Development**

**[US] Erwin Marquit**

The aim of this paper is to show the interconnection between scientific development and Marxist philosophy of the natural sciences. The failure to recognize this interconnection generally expresses itself in the narrow focus of natural scientists on their fields while being oblivious to the consequences of their activity on other fields. The primary fault for this lies not with the natural scientists themselves, but with the educational and institutional ignoring of philosophy of the natural sciences or its isolation in the philosophy departments of the social science universities and academies.

In reality, no separate Marxist philosophy of the natural sciences exists distinct from dialectical and historical materialism. Marxist philosophy of the natural sciences is the application of dialectical and historical materialism to investigations in the various natural sciences. Nevertheless, because philosophy viewed as a scholarly pursuit is invariably assigned to the social sciences, philosophical investigations relevant to the natural sciences are either ignored in the social science institutions (social science academies or university departments), or, if included the scope of their work, are carried out in isolation from the work of the natural sciences. Another factor that comes into play is that the term *historical materialism* is generally viewed as an alternative expression for the materialist conception of societal development. This misunderstanding can lead to the failure to incorporate historical materialism into work related to philosophical problems in the natural sciences and limiting the philosophical apparatus to dialectical materialism alone.

Marx, Engels, and Lenin devoted their lives to establishing the basis of the theory and practice that was necessary to equip humankind with knowledge enabling it to effect the revolutionary transformation of society from exploitative relations of production to a communist society, a society based on nonexploitative relations of cooperation and mutual assistance. This knowledge was needed because, unlike previous processes of societal transformation, this transformation cannot unfold without conscious understanding of the nature of the historical process of societal development.

Despite their focus on the immediate and long-term problems of societal development, these thinkers paid considerable attention to developments in the natural sciences. Marx, of course, concentrated primarily on his study of economics, but frequently exchanged comments with Engels about developments in the natural sciences. As part of their well-known division of labor, Engels concentrated on the natural sciences and even began

to write a book on the dialectics of nature. Lenin wrote two books of several hundred pages in his lifetime: *What Is to be Done?* and *Materialism and Empirio-Criticism*; the latter is entirely on the philosophy of natural science.

Why did they need to give such philosophical attention to the natural sciences?

They found it necessary to do so in order to integrate the natural and social sciences into one methodological framework for scientific investigation. Such integration was necessary because all levels of matter, both physical and social, are the ultimate source of our consciousness about the material world in which we live. Only this integrated philosophical framework can provide a profound understanding of the processes of change in the spheres of nature and society, as well as the means for addressing methodological questions in scientific research.

The crisis in physics during the development of quantum physics in the 1920s was rooted in philosophical controversy, epitomized in Einstein's comment that he could not believe that God played dice with the world. It was not the professional philosophers who solved the crisis, but a small group philosophically aware physicists who were in constant consultation with one another.

Philosophy of the natural sciences is also needed because of the interconnection between the natural sciences and societal development. This interconnection exists, of course, whether or not natural scientists concern themselves with it. But, as I stress again, the problem is that natural scientists, in their education and work, tend to ignore this interconnection and focus intensely and narrowly on their particular fields of theory and practice, oblivious to the consequences of their work on other fields.

Consider, for example, the Green Revolution, a development in agricultural technology that increased agricultural production in many developing countries. Its application, however, also contributed to the growth of a surplus rural population that migrated to cities with no plan to absorb them, resulting in huge slum populations.

One can cite numerous scientific and technological advances that when introduced into the economy subsequently endangered human life—most notably the physical environment. In particular, inadequately tested new materials and chemicals have been introduced with toxic properties causing tragic results. How does this come about?

Initial answers to this question may be to fault regulatory agencies or cite the absence of regulatory legislation that would require adequate testing before the products are approved for use. While regulatory legislation requiring adequate testing is an absolute necessity, the initiative for signaling such testing should be built into the scientific methodology of the scientists involved in the development. But this is not done. A major reason for this omission is that educational and research institutions in most cases relegate philosophy to the social sciences, and in doing so isolate philosophy in a separate department. Philosophical research in the natural sciences is then perceived as a diversion from the natural sciences. Instead, philosophy should be integrated into the individual

disciplines of the social and natural sciences.

This separation is unfortunate since it deprives natural scientists of intimate contact with the conceptual foundations of their sciences, unless they happen to self-educate in the philosophical literature concerning their fields as well as in philosophy in general. At my own university, a leading research university in the United States, the physics department would not consider research in philosophy of physics as a contribution to our knowledge of physics. This research would be treated as a diversion from physics and appropriate only for philosophy departments.

The problem here is that when research in philosophy of physics is carried out by philosophers in a philosophy department, the tendency is to view the results of such research as a contribution to philosophy. A physicist conducting research on philosophical problems of physics, however, is seeking to apply philosophical knowledge to the understanding of physics rather than to make a contribution to philosophy.

The narrowness that is inevitably associated with mechanistic applications of science and technology can only be overcome by incorporating awareness of the dialectical interconnections among the sciences into the education and work of natural scientists.

Solutions to methodological problems in a number of the natural sciences have been heavily rooted in philosophical considerations. As in the case of the crisis in physics around the discovery of quantum effects, these solutions were found not by philosophers, but by scientists working in these specific fields.

Here are some examples of the many that could be cited. I'll start again with the already mentioned crisis in physics. Prior to the 1920s, the concept of causality in physics was based on the principle that a single cause produces a single effect. With the emergence of quantum physics in the 1920s, this principle was thrown into confusion because it turned out that a single cause could produce a variety of effects. The outcome of a precisely established experimental process could not be predicted uniquely, but only statistically. This seemed to invalidate the philosophical principle of determinism. Marxist physicists—Langevin in France, Fock in the Soviet Union, and Taketani in Japan—showed that a materialist concept of determinism was not locked into what was essentially a mechanistic principle that a single cause produced a single effect. They demonstrated that acceptance of statistical laws as fundamental laws of physics was still an expression of determinism consistent with a materialist outlook. What may be surprising to Marxists unfamiliar with their history is that Langevin of France, Fock of the Soviet Union, and Taketani of Japan, were all members of their Communist parties, and had to do battle with the dominant bodies in their parties who had been schooled in the tradition of separating philosophy institutionally from the individual sciences.

In the 1920s, the Marxist biochemist Joseph Needham introduced the philosophical and methodological concept that is today phrased as *levels of integration and organization*

*of matter*, each level having its own laws. For example, in physics we now have fields of specialization known as elementary particle physics, nuclear physics, atomic physics, molecular physics, solid state physics, biophysics, etc. This recognition of levels of integration and organization of matter and the interconnection of levels to one another led Needham to appreciate this interconnection to the point where he and the Chinese colleagues who worked with him became the leading historians of the development of science and technology in China, where he is known under the name Li Yuese (李约瑟).

In the 1960s, Marxist psychologists in the United States led the struggle against racist concepts in education that maintained that African Americans were genetically inferior in intelligence to white people. The basis of this racist theory was the claim that the social component of intelligence could be factored out, that it could be separated from the biological component. One of the consequences of these racist theories was the attempt to introduce in New York City separate programs for African American children taking into account their allegedly inferior intelligence and adjusting their aspirations accordingly, rather than educating them fully. Basing their work on Needham's contributions, the Marxist psychologists showed that the social level of the human being had to be treated as a higher level of development than the biological level, so that such factoring out was meaningless scientifically. They showed, moreover, how IQ tests were socially biased against low-income populations.

Although the attempt to introduce such changes in the New York public school system was beaten back, racist theories of human behavior have been embodied in Edward O. Wilson's book *Sociobiology: The New Synthesis*, which has been translated into many languages, including Chinese. Presenting itself as a materialist outlook, this pseudoscience maintains that human behavior is ultimately genetically determined—some people are born to be successes in life, others failures; some are born to lead, others to follow. Sociobiologists argue that aggressive behavior is natural because its source is in our genes, as is the trait of greed and the desire to accumulate wealth. Society, according to the sociobiologists, must therefore accept these as immutable characteristics of human society and not attempt to generate contrary value systems. Marxist geneticists psychiatrists, and psychologists have in dialectical and historical materialism a powerful methodological weapon to counter such racist pseudoscience.

Scientific development includes the scientific integration of the labor force. Racist and other unscientific theories of human capabilities impede the process of matching human potential to the needs of development.

Recognition of the need for the scientific factor in the process of development should therefore draw attention to the interconnections among the scientific fields that contribute to the process of development and the all-embracing character of the philosophical and methodological training of scientists. The scientific infrastructure for scientific

development must necessarily include Marxist philosophy of the natural sciences in the universities and academies of the natural and social sciences.

**[US] Ganesh K. Trichur**

**Contact Information**

Address:

Telephone:

Fax:

Mobile:

Email Address:

Homepage:

Assistant Professor, Political Economy, St. Lawrence University, Canton, NY 1361

I teach global political economy, Asian political economy, and Chinese political economy. Recent publications of mine include:

"Political Islamism and Political Hinduism as forms of social Self-Protection in the Modern World-System", in Khaldoun Samman and Mazhar Al-Zo'by eds. (2008) *Islam and the Orientalist World-System*, Palgrave, NY

"Spectacular Privatizations: Perceptions and Lessons from Privatization of Welfare and the Privatization of Disaster", in Hillary Potter ed. (2007) *Racing the Storm: Racial Implications and Lessons from Hurricane Katrina*, Lexington Books, Maryland.

"The New Imperial Conjuncture and Alternative Futures for the Twenty-First Century Global Political Economy", in *Globalizations* (Routledge) May 2005

"Empire and Its Multitude" (co-authored with Steven Sherman), in *Journal of World-Systems Research*,