ABSTRACTS

C6.2 Philosophy of the Applied Sciences and Technology

Galilean technoscience

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Galileo Galilei was one of those who created this new science oriented to technical needs. He made the important step in the revision of the Aristotelian physics. But the Aristotelian conceptual structure remains not only in the Galilean technoscience, but also in the nanotechnoscience. The same conceptual structure was the basis of the ballistic as new engineering theory of Niccolo Tartaglia. Galileo created more than a model of experimental activity; he demonstrated how to develop scientific knowledge so that it could be used for technical purposes. This approach became possible because Galileo's new science had its roots in technical practice and was oriented to it. In his new science, Galileo manipulated natural objects like the present-day engineer. However, Galileo's new style of scientific-engineering and engineering-scientific thought and action manifested itself mainly in the sphere of thought rather than in practical activity. Galileo's works paved the way for the formation of engineering thinking and activity in practice as well as theory. That is why his science was not only the embryo of the natural sciences but also engineering science and was really technoscience similar modern technoscience (e.g. nanotechnoscience). (RGNF project 13-03-00190).

Mode 2 of Knowledge Production and Mixed Techno-Scientific Roots of Computer Science

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Computer Science includes a spectrum of disciplines: from mostly engineering ones to pure discrete math through dozens of mixed disciplines. The continuous collaboration of these fields results in flow of innovations in contemporary Information Technology. Hence, Computer Science is mixture of both technology and science.

In "The new production of knowledge" [Gibbons'94] it was argued Computer Science was initially developed as Mode 2 of knowledge production. Mode 2 is transdisciplinary, accountable and reflexive knowledge produced in context of application. It opposes to Mode 1 monodisciplinary science pursuing universal truths. Mode 2 produces both science, technology and public good in one coherent framework.

My aim is to develop the account of Computer Science as Mode 2 by getting deeper into
what exact events, principles and practices made Computer Science referred as Mode 2 of knowledge production.

This exploration helps clarifying the distinction between: 1) applied sciences and Mode 1-engineering disciplines on one hand; 2) present Mode 2 domains of knowledge production like Computer Science, Biotechnology, Nanosciences, and so on, on the other. The distinction marks the demand of new concepts in philosophy of science and technology to perceive the latter.

Confucianism and architectural technology in traditional Chinese society

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In contrast with European architecture, which went through a tremendous change of stylistic trends, the evolution of traditional Chinese architecture followed a unique course in which there was only small and slow variation over thousands of years. Unsolved issues remained in the development process of traditional Chinese architectural technology, such as the lack of motivation to build high structures except for Buddhist temples and the delay of applying masonry structure in domestic architecture despite the already existing tradition of using it in tombs. In general we can observe a degeneration of rational structure design for instance the disappearance of triangular support in roof structure.

All those issues seem to be related with the famous Needham Puzzle. Or in my case to the question why given that the technologies were existing and already in use their wide application was discourage or they degenerated? I'm arguing that the reasons for that phenomenon are due to something more than historical contingency. My proposal is that the underlying factor which did not permit the evolution of architectural technology was due to a broad philosophical trend in traditional Chinese culture. The Confucian ideal of modesty and humbleness influenced the layout of cities and the design of buildings. In turn the preference for static systems over more dynamic mechanical system was the reason why the usage of triangular support was discouraged.

All this lead to a restriction of large-scale constructions and depressed the development of high level architectures, although the underlined technology was already available to architects and was in some cases more economically efficient. Finally I believe that this historical case study will contribute to the understanding the complex relation between philosophical values and technological development.
A Re-Examination of the Relationship Between Science and Technology

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This paper attempts to revive interest in the old and apparently out-dated problem concerning the relationship between theoretical science and technology for two main reasons. Firstly, it aims to show how philosophical understanding of the science-technology relationship has long been associated with two dangerously misleading prejudices. Secondly, it intends to shed light on the radical implications of Popper’s distinctive vision of science - an enterprise of bold conjectures and blunt refutations - for some of the key debates in philosophy of technology.

In the history and philosophy of technology studies of the relationship between science and technology have been largely dominated by the technology-is-applied-science thesis and the objections to this thesis. Critical reviews of the existing literature show that different arguments have been advanced by historians and philosophers of technology to characterize technology as an autonomous body of knowledge, different from science. Some scholars, for example, have tried to contrast directly scientific and technological knowledge, while others have emphasized the tacit and prescriptive nature of technological knowledge.

In contrast to these current arguments advanced against the technology-is-applied-science thesis, this paper questions the credibility of the said thesis on the grounds that it has emerged from the ancient philosophical doctrine of induction which nurtured two misleading prejudices, namely, that scientific hypotheses are prompted directly by perceptual experience and that technology emerges out of science, and is based firmly on science. Drawing on some key features of Popper’s Searchlight theory of knowledge I try to renounce the former prejudice in the first section of this paper. The second section of this paper aims to overthrow the latter prejudice on the basis of an analysis of Popper’s critical rationalism that emphasizes a critical (but not a constructive) function of theoretical science in technology.